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Proceedings and Debates
OF THE
THIRD NATIONAL
13488
QUARANTINE AND SANITARY
CONVENTION,

HELD IN THE CITY OF NEW YORK,

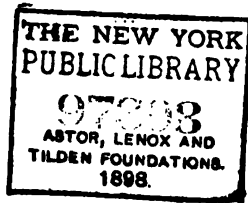
April 27th, 28th, 29th, and 30th, 1859.

REPORTED BY CHAS. COLLAR AND WM. ANDERSON, PHONOGRAPHIC REPORTERS, NEW YORK.

BOARD OF COUNCILMEN,
September 19, 1859.

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1859.



Board of Councilmen, }
SEPTEMBER 19, 1859.

Proceedings and Debates of the National Quarantine and Sanitary Convention, with report of the Special Committee thereon, as presented to the Board of Councilmen on the 19th of September, 1859, which was received and 2500 copies ordered to be printed.

C. T. McCLENACHAN,

Clerk.

Reported and Printed under the supervision of the Representatives in the Convention from the Board of Councilmen of the city of New York.

FRANKLIN J. OTTARSON, *Chairman* ;
JOHN VAN TINE,
BENJAMIN T. RHODES,
WILLIAM LAIMBEER, JR.,
MORGAN JONES,

CHARLES G. CORNELL,
President of the Board of Councilmen.

INTRODUCTION.

As a suitable introduction to this volume, the following letter, presenting a brief history of the rise and progress of the QUARANTINE AND SANITARY CONVENTIONS, is inserted.

420 NORTH 6TH STREET, }
PHILADELPHIA, Sept. 24th, 1859. }

JOHN H. GRISCOM, M.D. :

Dear Sir : Your kind and polite note of the 22d inst., was received yesterday, containing suggestions in reference to the preparation of an "Account of the Rise and Progress of the Quarantine and Sanitary Convention," to accompany the published proceedings of the late meeting of that body in your city.

I accord with your judgment entirely, as to the desirableness of prefacing the forth-coming work with the principal facts and arguments that led to the conception and call of a Quarantine Convention. I should be most happy also to accede to your proposition, and prepare a history of the movement, but the lateness of the hour at which you request has been made previous to the appearance of the work (being nearly through the press), and the pressure for time, owing to other important and prior engagements, forbid my undertaking any thing more than a very brief outline of the circumstances which conceived, and the measures which resulted in the organization of the first American Congress that ever convened for sanitary reform—the inauguration of a movement, that may well be regarded as a feature of the age in which we live, and second to none other that has found favor with an enlightened people.

After an experience of eight years as a member of the Board of Health of this city, and after a careful examination into the character and practical working of the laws of quarantine of our own as well as those of other States, it required no argument to convince me that they were incumbered with serious defects, which weakened their influence, and retarded their usefulness. They advocated antiquated and obsolete doctrines; they embarrassed commerce, oppressed the merchant, imposed severe restrictions on the healthy, inflicted cruelties on the sick, and when rigidly enforced, became the ready means of disseminating and entailing disease and death.

These glaring imperfections, and the inconsistency of quarantine enactments with each other in the different States, together with the frequent embarrassments arising from abortive efforts to enforce and apply quarantine regulations, engaged my serious attention. Thus circumstanced, I was prompted to the inquiry, How can a revision of the present ill-advised systems of quarantine laws be most judiciously and extensively effected? A uniform code of

regulations, operating alike in all our sea-ports, and offering the least hindrance to an active commerce, and with a humane regard for the health of the passengers and crews, and the comfort of the sick on board of all vessels detained at quarantine stations, suggested itself as the only correct fundamental principle for accomplishing the necessary reform in quarantine legislation.

How to bring about a change so desirable, became a question of no ordinary import. Difficulties hedged up the way in whatever aspect I viewed the subject. These difficulties were greatly enhanced from the fact of the magnitude of the responsibility I was about to assume, in announcing my determination to agitate the public mind upon the great question of a uniform understanding and thorough revision in the system of quarantine.

A knowledge of the fact, that with the great commercial nations of Europe the efficiency of quarantine had assumed a very commanding position among the topics in the science of hygiene, and had led to the holding of a *Conférence Sanitaire* in Paris, in 1851 and '52, offered to my mind the idea, that a national convention of judicious and well-informed delegates, from the seaboard cities of our Atlantic States, might be influential in adjusting disputed points, and become the medium through which commerce could be relieved from the trammels that existing codes of laws had unnecessarily imposed upon it. Each day's reflection brought with it a wider range of thought, and strengthened the conviction as to the important sanitary results that would flow from the deliberations of such a Convention, especially in the event of those who might be delegated, possessing the required ability to investigate conflicting theories, adjust discrepant facts, and clear away the rubbish of error, superstition, and prejudice which overlaid the truth, and thus give it a character commensurate with the magnitude of the cause and the expectations of an awakened public.

Entertaining these views, I unfolded my plans to several medical friends, who listened attentively, acknowledged the benefits to be derived from a reform in the laws of quarantine, but looked upon the undertaking as too difficult to carry through successfully. Not in the least discouraged, I ventured to bring the subject before the Board of Health of our city, of which body I was at the time a member. Upon them I urged the initiatory step in this important sanitary movement, pointing out to them the propriety of such modification as should place the whole system upon an equality with the present improved state of the science of hygiene. Here, also, I not only encountered indifference where there should have existed whole-heartedness in the work of reform, but met with decided opposition to my disinterested efforts in providing a remedy for well-known defects in our code of health laws, and which as a Board they regarded as both oppressive and unjust.

By an earnest and persistent course, however, I finally secured not only the attention, but the confidence and approbation of a majority composing the intelligence of the Board, and on the 10th of November, 1856, I offered the following resolution :

Resolved, That a Committee of three, with the President, be appointed to correspond with the Boards of Health of New York, Boston, Baltimore, and New Orleans, on the propriety of calling a convention of delegates from the various boards of health in the maritime cities of the United States, for the purpose of a conference in relation to the establishment of a uniform system of revised quarantine laws.

After a careful review of the proposition, the resolution was unanimously adopted, and the Board pledged their hearty co-operation. As chairman of the said Committee, I immediately forwarded copies of the resolution to the Boards of Health of the several cities named therein, urging upon their attention "the importance of a revised and uniform system of quarantine laws, for the protection of the maritime cities of the United States from the introduction and spread of disease through the channels of commerce, and I also solicited their approval of the suggestion of calling a convention of delegates from the several Boards of Health in the commercial cities of the States, as the only feasible plan for accomplishing an object second to none other in importance, and one altogether worthy the highest consideration of those who were the custodians of the public health."

To this appeal, I am happy to say, the Committee received the hearty concurrence of those bodies to whom it was addressed, with an assurance that they were prepared to move cheerfully and harmoniously with their sister city in any matter of general welfare; and I here take occasion to acknowledge that they have nobly redeemed their pledge.

The Board of Health, upon receiving the report of the cheering success of their Committee, and realizing that the time had arrived when the assembling of an American Congress for Sanitary Reform would be hailed with universal favor, assumed the responsibility of inviting delegates from Boards of Health, Boards of Trade, and from regular Medical Societies in each of the principal sea-board cities of the States, to assemble in convention in Philadelphia, on the 13th of May, 1857.

Happily for the cause of humanity and the science of public health, the result of this effort has prospered beyond the expectation of its sanguine friends, and notwithstanding the willingness of some to see it defeated, and has inaugurated a new era in the domain of Science.

This first Sanitary Congress in America, which was held in the Supreme Court room, in Philadelphia, May 13th, 1857, gave the clearest assurance that the public appreciated the importance of the call. Nine States on the Atlantic coast were represented by twenty-six different authorities through seventy-three delegates. These delegations were not confined to the medical profession, but were selected also from the commercial and municipal departments. Five of our largest cities—Boston, New York, Philadelphia, Baltimore, and New Orleans—were ably represented; while the lesser cities were signalized by intelligent and efficient delegations.

The Convention remained in session during three days. Its deliberations, which were eminently harmonious, resulted in the adoption of a series of re-

commendations* confirming *in extenso* my own previously-conceived views. It was at this first meeting that the name of the Convention was changed to "The Quarantine and Sanitary Convention," with the laudable design of extending the usefulness of the organization, by embracing within its wide folds both external and internal hygiene. This change received the unanimous approval of every friend of the cause, and completed the circle which from the beginning had been contemplated.

The second annual meeting of the Quarantine and Sanitary Convention, or, now, the "Great American Congress for Hygienic Reform," was held in the Masonic Hall, Baltimore, April 29th, 1858. This year twelve States were represented by eighty-six delegates, showing an increase over the first Convention of three States and thirteen delegates.

The most important movement emanating from this meeting, was the appointment of two Committees, one on External Hygiene or Quarantine, and the other on Internal Hygiene, or the Sanitary Arrangements of Cities. The instruction given to the Committees was, to investigate with great care these profound national questions, in all their extensively-complicated and various fields of inquiry, and to prepare in season for another Convention, comprehensive reports on the several subjects embraced in the order of arrangement, under distinct heads, as submitted to them; the Reports to be printed if deemed advisable by the Committees.

The gentlemen selected as members of these Committees, were appointed with special reference to their interest in, and adaptation for, the work of Sanitary Reform. With commendable zeal they applied themselves to the laborious yet agreeable duties assigned them by the Convention. The results of their arduous performances have already been laid before the Convention, held last May in New York. How well they discharged the mission assigned them, may be inferred from the fact that their reports were adopted with but light alterations, and ordered to be printed with the proceedings of the body.

How far the views contained in these reports will receive the approval of the public, or serve as instructive guides in assisting to alleviate the physical evils in society, can be known only in the future.

In conclusion, sir, allow me to add, that I view the Quarantine and Sanitary Convention as a permanent institution; an association destined in the broad expanse of its future labors, to revolutionize the public mind and will, on the great question of Sanitary Legislation. The work of Sanitary Reform in our country has commenced in earnest, through the instrumentality of this Convention, and my earnest desire and prayer is to be engaged in the work in season and out of season, until I behold the first fruit of our united and persevering exertions displaying its rich influence in the organization of a well-ordered sanitary police, embracing both External and Internal Hygiene through legislative enactments, in all our large cities.

Very respectfully,

WILSON JEWELL.

* For the recommendations alluded to, see pp. 55 *et seq.*

OFFICERS OF THE CONVENTION.

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EDWIN M. SNOW, M.D., Rhode Island.

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J. MORIARTY, M.D., "

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J. M. WIGHTMAN, "

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P. M. WETMORE, "

Hon. W. M. BODMAN, Rhode Island.

Committee on Plans of Tenement Houses, (Page 86.)

CHAS. H. HASWELL, New York.

CALVERT VAUX, "

A. H. STEVENS, M.D., "

J. McNULTY, M.D., "

J. M. MINOR, M.D., "

**Committee on motion of D. B. Reid, M.D., on the Resolutions from
the Committee on External Hygiene, (Page 202.)**

A. N. BELL, M.D. ISAAC A. NICHOLS, M.D.
D. B. REID, " E. HARRIS, "

**Committee on the Quality and Supply of Food in Cities,
Markets and Abattoirs, (Page 211.)**

E. HARRIS, M.D., New York.
JOHN JEFFRIES, M.D., Mass.
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STEPHEN SMITH, M.D., New York.
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**Committee on Civic Cleanliness and the Economical Disposition
of the Refuse of Cities, (Page 211.)**

E. L. VIELE, New York.
CHAS. H. HASWELL, "
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Committee on Legal Control of Poisonous Drugs, (Page 211.)

PROF. C. B. GUTHRIE, Tennessee.
" E. H. DAVIS, New York.
WM. C. VAN BIBBER, M.D., Maryland.

Committee on Architecture, &c. (Page 211.)

J. W. RITCH, New York.
W. LAIMBEER, JR., "
J. H. GRISCOM, M.D., "

Committee on Dispensaries, (Page 225.)

F. E. MATHER, New York.
F. U. JOHNSTON, M.D., "
L. W. BUFFINGTON, M.D., Pennsylvania.
J. C. HUTCHINSON, M.D., New York.
T. H. TOWN, Pennsylvania.

Committee on Nature and Sources of Miasmata, (Page 226.)

PROF. J. DARBY, M.D., Alabama.
G. W. COWDERY, M.D., Virginia.
JOHN BELL, M.D., Pennsylvania.

NATIONAL QUARANTINE AND SANITARY CONVENTION.

NEW YORK, April 27, 1859.

THE Third National "Quarantine and Sanitary Convention" met, at ten o'clock A.M., at the College of Physicians and Surgeons, corner of Fourth avenue and Twenty-third street.

On motion of FREDERICK E. MATHER, of New York, the Convention was temporarily organized, by the choice of Dr. WILLIAM M. KEMP, of Baltimore, Md., as President, and CHARLES H. HASWELL, of New York, as Secretary.

A recess of fifteen minutes was, on motion of ALDERMAN BOOLE, of New York, taken, to prepare a list of accredited delegates to the Convention.

After the recess, the list of delegates was read.

Dr. BOYD, Health Officer of Brooklyn, stated that the authorities of that city had received no invitation to participate in the proceedings, but he appeared to represent that city, if it were desired.

PROSPER M. WETMORE, of New York, regretted to hear that no such invitation had been sent. He would move, therefore, that an invitation be extended to the Brooklyn Board of Health, which would entitle the gentleman now pre-

sent with us to a seat, and also such of his colleagues as he chose to bring with him to-morrow.

Mr. HASWELL, the Secretary, explained that invitations had been sent to the authorities of Brooklyn, to be 'used at their discretion.

The motion to invite the Brooklyn Board of Health was then agreed to.

Prof. JOSEPH M. SMITH, then addressed the delegates present in terms of welcome, as follows :

*Mr. President :—*Will you permit me to say a few words to the Convention. I will detain them but a moment. I desire to welcome you and the gentlemen who come from other States to the city of New York; and I do so with a feeling of assurance that you and they will be received with pleasure by my fellow-citizens; and especially for the reason, that I believe that each and all of you come well stored with knowledge on the subject of quarantine and the public health. I welcome those from my own city and State who are delegates to the Convention, now assembled in this hall of the College of Physicians and Surgeons of the University of the State of New York. Moreover, I would salute all who may be here, spectators of your deliberations.

And while I welcome, I would congratulate those who come from distances, upon their arrival in the great emporium of our country. I would congratulate my fellow-citizens upon meeting these strangers, delegates from our sister States. And I would congratulate the people of our whole country upon the occurrence of this great meeting of medical men, hygienists, laymen, magistrates and other public officers, assembled together in this place, to take into consideration matters of immense moment, in relation to the health and happiness of individuals and communities. It is, I am happy to say, an auspicious moment at which this convention occurs, auspicious, not only as regards the time, but auspicious as regards the place—I mean the city of New York.

The subject of public hygiene has, within the last year, occupied

the attention of the Legislature of New York. It has also recently engaged the special attention of a select Senate committee appointed to investigate the health department of this city, which committee sat for weeks, gathering facts and opinions from medical men and others, until at length they stored up a great amount of information relating to the subject, a treasure which will be enduring. Besides, there is in this city a Sanitary Association recently formed, which has under deliberation the great hygienic interests of the population. Here, too, is the Academy of Medicine, which has a section devoted especially to the subject of public health and legal medicine, a section which is laboring so far as lies in its power, from time to time, for the common good. These are the auspicious circumstances to which I refer. Indeed, the subject is now fairly before this community, and before the people of the Commonwealth. What happier moment could have arisen in which such a convention could take place than the present?

If any thing could add to the cordiality with which I greet you, it would be the consideration of the great subjects which are to be brought before you. The theme of public hygiene, how vast is it! its interests extend to every inhabited portion of the world, and especially that branch of it relating to quarantine. The very term brings up a long historical array of the talent and labor bestowed upon it. If my memory serves me rightly, as far back as 1423, the first laws were made in Venice regulating quarantine. There were then appointed officers expressly for the purpose of guarding that city from the plague; and from that moment until now, sanitary regulations have existed at all maritime ports in regard to plague and other forms of pestilence. It is true, they still exist, and yet, though such a long period has elapsed, how little has been settled on the subject. But I cannot go into the history of quarantines, hygienic regulations, sanitary cordons, and lazarettes. These are details, such as will no doubt receive your especial attention. There are, indeed, many important questions relating to the general subject which demand a rigorous investigation. Conventions designed to consider and decide such questions are taking place from time to time. It was, I believe, in 1838, that the French proposed to the British Government that a

general congress of delegates should be convened in Europe, with a view to devise and establish a uniform system of quarantine. Since then, various conventions and legislative bodies have examined the subject, and yet, how few are the things which are established upon an unchangeable basis. Here, in conclusion, let me add, is a Convention in regard to which I question whether one with similar objects could be constituted on the other side of the Atlantic superior to it in ability, and extent and variety of learning, or better qualified to take up and decide the great questions, relating to sanitary science, which are now so widely interesting the public mind.

With these few remarks, I again, by authority, welcome you to this metropolis; and I trust that you may find in this building every accommodation which can facilitate your important deliberations, and which, at the same time, will comport with the high consideration to which, as a humane and scientific body, you are entitled. (Applause.)

On motion of PROSPER M. WETMORE, of New York, it was

Resolved, That a Committee of one from each State represented in the Convention, be appointed by the delegates thereof, to report the names of permanent officers for the Convention.

In accordance with the resolution, the following-named delegates were appointed said Committee:

PROSPER M. WETMORE, of New York;
ALD. SILAS PIERCE, of Massachusetts;
DR. EDWIN M. SNOW, of Rhode Island;
MAYOR BIGELOW, of New Jersey;
DR. LEE W. BUFFINGTON, of Pennsylvania;
DR. JAMES F. WILSON, of Delaware;
DR. GILMAN, of Maryland;
DR. W. W. WILSON, of Virginia;
DR. JOHN DARBY, of Alabama;
DR. CHARLES F. FORCE, of District of Columbia.

The Committee then retired.

Mr. MATHER, of New York, moved the appointment of a

Committee to inquire into the expediency of adjourning the Convention to the "Cooper Institute," where the meeting was originally intended to be held.

He regarded it as a great mistake in meeting in this place instead of the Cooper Institute; and he said this, while acknowledging the kindness which had induced the tender of the room in which they were now assembled.

Dr. McNULTY stated the change was made because it was considered that the large hall of the Institute, which was capable of accommodating an audience of 2500 persons, was too large for their purposes.

PETER COOPER, Esq., who was present, said, that if the Convention desired it, they were welcome to use any of the halls of the Institute (applause).

After some further discussion on the subject,

The Secretary stated that the Executive Committee in the discharge of their duties, having this matter of rooms under their charge, visited the "Cooper Institute" at the invitation of Mr. Cooper. Before this room was offered, they accepted the kind offer of Mr. Cooper for the use of the hall in his building; but upon consideration, it was deemed impracticable to meet there, as the room was altogether unsuitable for a Convention, where discussion was to take place. The present room would seat 350 persons; and he trusted that there would be no change.

The whole subject was then, on motion of Dr. John H. Griscom, laid on the table.

The following gentlemen were invited to seats, as members of the Convention :

Hon. A. G. PIERCE of Boston, on motion of Dr. H. G. Clark.

Professor J. H. JEROME, Physician in Chief of the Quarantine Hospital, Staten Island, on motion of Dr. Harris.

Dr. WM. COOPER, of Troy, on motion of Dr. Wotkyns.

Hon. Dr. I. P. TRIMBLE, of New Jersey, on motion of Dr. Griscom.

Dr. JEDEDIAH MILLER, Health Commissioner of New York, on motion of Alderman Boole.

Hon. Dr. FRANK TUTHILL, on motion of Dr. John McNulty.

The Chairman read a communication from Mayor Powell, of Brooklyn, inviting the Convention to attend the celebration of the introduction of water into that city.

PERMANENT ORGANIZATION.

PROSPER M. WETMORE,

MR. PRESIDENT—I am instructed by a unanimous resolution from the Committee appointed to nominate officers to present their report. Before reading the names, I beg leave to state that in view of the important objects which have called us together, and the number of delegates present from the different States, to take part in the deliberations of the Convention, the Committee have determined to present a list of names, which to some persons may seem large, but which, in the city in which your Convention is held, is quite customary. The Committee have determined to nominate a President, twelve Vice-Presidents, and six Secretaries; and, with your permission, I will now present the following names for said offices:

For PRESIDENT—John H. Griscom, M. D., of New York.

VICE PRESIDENTS—Frederick W. Lincoln, jr., Mayor of Boston; Edwin M. Snow, M.D., R. I.; Joseph M. Smith,

M.D., New York; Isaac O. Nichols, M.D., New Jersey, R. La Roche, M.D., Pa.; Jas. F. Wilson, M.D., Del., Jacob W. Hanck, M.D., Maryland; C. Whittle, Va.; Prof. John Darby, Ala.; Francis Mohun, D. C.; Wm. A. Piper, M.D., Pa.; Chas. G. Cornell, President of Board of Councilmen of New York.

SECRETARIES—Charles H. Haswell, New York; H. St. Clair Ash, M.D., Pa.; A. N. Bell, M.D., Brooklyn; E. D. Hurkle, M.D., Maryland; Gabriel Grant, M.D., New Jersey; Henry G. Clark, M.D., Mass.

On motion, the nominations were unanimously agreed to.

On motion, a Committee of two—Mr. Wetmore and Alderman Boole—were appointed to conduct the President elect to his seat.

On resigning his place, Dr. Kemp, the temporary President, said, addressing Dr. Griscom:

It gives me great pleasure to resign my place into your hands, for I feel that the interests of the Convention will most assuredly be promoted greatly by your presidency over its deliberations. The two preceding Conventions have not accomplished a very great deal towards the settlement of the questions which they have had under deliberation. The first was pretty much a Convention of deliberation only—a few fundamental principles were agreed upon by that body. The second Convention appointed important Committees, which Committees are to report at this session. The business, and the matters connected with these subjects, are now transferred to your superintending hands.

Dr. GRISCOM, the President elect, then addressed the Convention as follows:

Gentlemen of the Convention:

Could you but feel the palpitations which now agitate my bosom,

you would sympathize with me upon this occasion. For the first time have I been called to preside over a body of this character. That I should have been selected before men so much my seniors and superior to me in information and in abilities, to preside here, is to me a matter of some astonishment, and no less one of gratification.

As the retiring President has just stated, and as has been eloquently laid before you by Professor Smith, in his charge of welcome, the matters which concern us here, are those of the deepest interest to humanity. They are world-wide in their influence, and they are interwoven with every position of society, and with every circumstance of the individual. Hence I have no doubt that you will bring to bear upon this subject, such a degree of deliberation as will show your appreciation of its importance. The objects which call us together are divided into two classes—first, those relating to the *external*; and secondly, those relating to the *internal* sanitary police of communities. The first has a philosophy and practice as broad as commerce; the second has details as numerous as the individuals of the human family. The house upon the heath, and the crowded tenement in the populous city, are both subject alike to circumstances which produce disease and death, if not properly guarded. Our life is limited by nature; but we limit it ourselves, to a greater degree, by neglect of circumstances under which we should otherwise live.

In occupying your attention for a moment with a few introductory remarks, I beg leave, earnestly, to commend especially to your attention, the subject which is embraced in the second part of the call—that which I understand to relate particularly to the hygienic condition of cities. So far as the external police is concerned, the arm of the law is capable of mastering it; but internally it requires the education of the people; it requires an education of the head of each family; it requires an education of every inmate of the family; and you cannot perform a greater service to humanity at large, than to lay out a plan of education in the matter of public hygiene, which shall receive the attention of every individual.

Gentlemen, when you come to examine the relative importance of quarantine matters, with that of the internal concerns of cities,

you will find a most extraordinary disparity to exist. And while I have this matter before me, permit me to state to you briefly my views in regard to it. With a few statistics, which this morning I gathered for another purpose, this subject may be presented to you in its true light.

The subject of quarantine has occupied the attention of mankind from time immemorial; but that of internal defenses against individual diseases, scarcely, until within a very few years. Yet what do we find to be the results in reference to these different circumstances? For example, in the city of New York, we have lost by *Cholera*, in twenty-five years, 12,300 inhabitants; by *Cholera Infantum*, 15,000; within twenty years, we have lost by *Hydrocephalus*, 12,400; by *Cholera Morbus*, 1400; by *Erysipelas*, 2100; by *Convulsions*, 20,000—i. e. convulsions belonging to and affecting infantile life. These are diseases which are generated chiefly within the city, and within the domicile itself, against which the city is defenseless; while from *Yellow Fever*, which can be kept out, and which is not generated amongst us, we have lost in *fifty years* only 600.

This, gentlemen, is my appreciation, stated in figures, in round numbers, of the relative importance of these two classes of objects which have brought us together. (Applause.)

Gentlemen, I have the honor to represent upon this floor, an Association, the first, I believe, of its kind in America, and perhaps the only one yet existing.

A Sanitary Association has been created here—drawn out by the urgency of the circumstances in which the city of New York has been placed. It is composed, not of medical men alone, not of laymen alone, but of both classes—for both and all are deeply interested and concerned, vitally, in the great question of sanitary reform. And as my learned friend, Professor SMITH, stated to you in his welcome, that you have met in an exceedingly auspicious place on this occasion, permit to say that you cannot find, perhaps anywhere—certainly not upon the face of this Western hemisphere, a more auspicious one, that is to say, one in which the demands for sanitary reform are greater than here, with a mortality, according to statistical returns, exceeding that of most other cities in the

United States. Gentlemen, you meet here to help us in the work of sanitary reform. Give us your aid, and not only that: I beg of you, gentlemen, to carry away with you, when you separate from this place, this idea: that the New York Sanitary Association, which by mere force of circumstances, has been made the pioneer association, shall no longer be alone in existence; that in every city, in every town, in every village, and in every country hamlet, there shall be a sanitary association, devoted to the information of the people upon matters which effect their health—one which shall influence the law-makers of the country to reform abuses to which the people are subjected.

Gentlemen, I thank you most cordially for this mark of your confidence; and if in the administration of the duties of the chair, you find me deficient in any of those matters necessary to facilitate your business, and promote your comfort, attribute it not, gentlemen, to any defect of the heart, but only of the head. (Applause.)

On motion of PROSPER M. WETMORE, a vote of thanks was tendered to Dr. WM. M. KEMP, of Baltimore, for the ability, intelligence, and impartiality with which he had temporarily discharged the duties of the Chair. (Applause.)

The question about attending the Water Celebration at Brooklyn being undisposed of, some little discussion ensued thereon.

Dr. STORER, of Boston, inquired, if it was intended to suspend the business of the Convention, in order that delegates might attend this celebration. The duties of their procession would compel many of the members to return home in two or three days, and he hoped that the Convention would not be drawn off from its business by any invitation, however pleasant or grateful it might be to their feelings.

Alderman BOOLE moved that the Convention adjourn to Friday, in order to attend the Celebration, which motion was lost by a large majority.

On motion of Dr. KEMP, of Baltimore, it was

Ordered, That the sessions of the Convention be held daily, from 10 o'clock, A.M., until 3 o'clock, P.M.

On motion of Dr. HARRIS, of New York, it was

Ordered, That a Committee, consisting of one delegate from each State represented in the Convention, be appointed to prepare business for the Convention.

REPORT ON QUARANTINE.

The Report of the Committee on Quarantine was then, on motion of Dr. McNulty, laid over, and made the special order for to-morrow. The motion was subsequently reconsidered by request of Dr. Kemp, and the original mover withdrew it.

On motion of Dr. McNULTY, of New York, it was

ORDERED, That the rules and orders adopted for the Convention in 1857, be adopted now.

Dr. KEMP, of Baltimore—As the Chairman of the Committee on Quarantine, Dr. Jewell, of Philadelphia, is not present, I beg leave to make the following statement. A portion of the report from Dr. Wragg, of S. C. was not received in time in Philadelphia, to be printed continuously, and embodied with the other; but it appears in this report as the fourth point. The fifth point—the Best Means for Purifying Infected Vessels—was intrusted to the member of the Committee from Brooklyn (Dr. Cleveland), who was not ready with the matter in time to have it connected with this report; but I was informed that it would be ready to be presented to the Convention when it assembled. If Dr. Cleveland is present, and is prepared to present his report on the fifth point, then

this report will be complete ; otherwise, I want the Convention to understand that it is not complete. The report from Dr. Miller, the Chairman of the Committee on "Internal Hygiene," is a very long document. I have not yet had an opportunity of examining to see whether the report is complete or not. But my name appears at the end of this report of the Quarantine Committee, and I make this explanation because the report is not perfect. I would ask the Secretary to read the following letter from Dr. Jewell.

The *Secretary* then read the following letter :

PHILADELPHIA, April 26, 1859.

To the President and Members

of the Quarantine and Sanitary Convention :

GENTLEMEN—Detained from the meeting of the Convention by the force of professional circumstances entirely beyond my control, I herewith beg permission to submit the Report on Quarantine. This report has not only been carefully prepared, but in accordance with a resolution of the Convention of last year, held in the city of Baltimore, a sufficient number of copies have been printed for the use of the members of this Convention.

As this arrangement has necessarily involved a considerable outlay, and as no funds were placed in the hands of the members of the Committee to defray the expense, I would herewith in their behalf, suggest the propriety of the Convention taking action in the matter.

Very respectfully,

WILSON JEWELL.

Dr. KEMP moved that so much of the report as had been completed be read, which motion was not agreed to.

The reports on Quarantine, and on the Internal Hygiene of Cities, were then made the special order for to-morrow morning.

The President appointed the following Committee on Business :

E. HARRIS,	M.D.	JOHN JEFFRIES,	M.D.
W. M. KEMP,	"	JOHN DARBY,	"
M. BALDWIN,	"	GEO. W. COWDREY,	"
W. MAHERRY,	"	C. F. FORCE,	"
E. M. SNOW,	"	JAS. F. WILSON,	"

On motion of Dr. E. HARRIS, it was ordered, that where a municipal government is represented, that one member from such delegation be added to the Committee.

Whereupon, the President submitted the following names :

Hon. F. W. LINCOLN, Jr., of Boston.
 F. J. OTTARSON, of New York.
 H. N. PARKHURST, of Newark.
 G. A. HENDERSON, of Baltimore.
 W. H. C. LOVETT, of Norfolk,
 C. V. CLICKENER, of Hoboken.
 Hon. W. M. RODMAN, of Providence,
 Hon. D. S. GREGORY, of Jersey City.

Invitations were received and accepted to visit the "Cooper Institute," "Astor Library," "Historical Society" Rooms, and the "Demilt Dispensary."

The Convention then adjourned till to-morrow morning at ten o'clock.

SECOND DAY—THURSDAY, APRIL 28TH.

The Convention met at 10 o'clock A.M., and was called to order by the President.

The journal of yesterday was read by the Secretary, and approved.

The PRESIDENT laid before the Convention a communica-

tion from the Governors of the Alms-House, inviting the body to visit the institutions under their charge, which, after some discussion thereon, was laid over for the present.

The PRESIDENT also laid before the Convention a communication from the New York Common Council, inviting the Convention to a dinner at the Metropolitan Hotel, on Saturday evening next, which was also laid over for the present.

REPORT OF THE BUSINESS COMMITTEE.

Dr. HARRIS, Chairman of the Business Committee, submitted the following report, which was read by Dr. JOHN JEFFRIES, and accepted :

The Business Committee, appointed to present to this Convention the several subjects to be brought before them for their consideration, beg leave respectfully to

REPORT :

That a Committee on this subject having reported very fully at the preceding Convention, held in the city of Baltimore on the 29th of April, 1858, and having presented prominent and important subjects for the consideration of this body of Delegates, it only remains for your Committee to present the reports which are now before the Convention, in such form as will most facilitate their action, while at the same time it shall afford such an opportunity for a free and full discussion of the subjects presented, as their importance seems to demand.

Your Committee, therefore, recommend that the business brought before you shall be as follows, viz :

1st. That this Convention consider the subject of "Quarantine Regulations," by an adoption or rejection, in whole or in part, of the second and third propositions, contained in the intelligent report of the Committee.

2d. That this Convention consider the subject of the "Internal Hygiene of Cities," by an adoption or rejection of the "Sanitary Code," reported by Dr. HENRY G. CLARK, of Boston, to the Committee on that subject, and now presented by them to this body as an appendix to their report.

3d. That as the subject of registration of births, deaths, and marriages, has not been finally reported upon, and is in able hands, this subject shall be deferred, to be acted upon by a future Convention.

Your Committee believe that a proper consideration of the two reports now before the Convention, will occupy as much time as the Delegates can give at this session, to the subjects with which they are intrusted.

Your Committee further recommend that if the "Sanitary Code" referred to as the second subject, should meet the approval of this Convention, that the code, with such alterations or amendments as shall have been made to it, be published, with the expressed sanction of this Convention, and with the recommendation that it be adopted, in full, as the basis of a "Sanitary Code," by all the principal cities and towns in the Union.

ELISHA HARRIS, } *In behalf of*
JOHN JEFFRIES, } *Committee.*

The Second Part of the Report on Quarantine was then read at length by Dr. Nichols, of Newark, N. J., one of the Secretaries. (See appendix.)

Dr. McNULTY moved the adoption of that part of the report, which involved the following questions:

"Have quarantines secured the object for which they were originally intended? If not, the reasons of their failure?"

He hoped that the whole subject would be thoroughly discussed by the Convention. He regretted that the re-

port did not recommend the entire abolishment of Quarantine, for he considered that more evil than benefit grew out of it. He believed it was a commercial curse, for the reason that it led the inhabitants of cities in the immediate vicinity of a port of entry, to place confidence in the protecting power of Quarantine, thereby causing them to neglect those internal sanitary regulations which could alone protect them from disease. The result was, that Quarantine failed to prevent the introduction of disease; they were not prepared with their internal sanitary arrangements to meet it, and thus an epidemic, when it did come, would destroy thousands and thousands of lives.

The PRESIDENT: The first order of business is the consideration of the 2d and 3d propositions of the report on Quarantine. These matters being coincident with each other, it is competent for the Convention to take action upon them, at once. The first question in order will be the acceptance of the report.

Dr. E. HARRIS, of New York: Before the report is acted upon, I believe an explanation is desirable respecting the views entertained on this subject by the Business Committee. It is not the design of the Committee, by their recommendation, to exclude any portion of the reports or any topic, from discussion; but the design is merely to give, if possible, such a happy direction to the discussions as will best facilitate the fulfillment of the purposes of the Convention. Though the discussion of the 2d proposition of the report relative to Quarantine, might profitably occupy much time—and the Convention may deem it expedient that the subject of that proposition should be fully opened for debate, the Committee believe that the 3d proposition is the more important, and it is hoped that the recommendation for a discussion of that proposition may be especially regarded.

The Committee believe that the important subjects upon which Dr. Van Bibber, Dr. John Bell, and Dr. Griscom, have presented printed Reports, deserve and will receive the careful study of the members of this Convention, and will command the attention of all intelligent citizens into whose hands those learned and practical essays may fall. But those elaborate Reports—the fruit of great experience and research, are adapted for our edification rather than for our discussion. As much might be said of Dr. Clark's Draft of a Sanitary Code—a work that has scarcely an equal in any country for completeness—but the absence of any general Sanitary Code in our American cities, and the exigencies of the times, demand the consideration and adoption of that Code, or some modification of it, by this Convention.

On motion, the report was accepted.

The first part, embracing a history of Quarantine, was then adopted by the Convention without discussion.

DR. GUTHRIE, of Memphis, Tenn.: Although I have not the honor of being a delegate to this Convention, I have a few facts in my possession with regard to the prevalence of Yellow Fever in Memphis, Tennessee, where I claim to have a residence, which, with the consent of the Convention, I will read, as they may elicit other facts from gentlemen present, who have given this matter consideration.

The PRESIDENT remarked that the Convention would be very happy to hear the gentleman.

On motion of Dr. McNULTY, Dr. Guthrie was then admitted to a seat in the Convention as a delegate.

Dr. GUTHRIE: I design to take up but a very few minutes of your attention. I will say that I reside in Memphis, Tennessee, that I spent the summer of 1854 and 1855 there,

when we were suffering from the Yellow Fever. In the summer of 1854, when they had the Yellow Fever in New Orleans, they had no Quarantine there. Some forty odd persons, sick of Yellow Fever, were landed at our port, carried through the town, treated at the Hospital, and the dead were buried there, without a case originating in the town. In the summer of 1855, when they had enacted Quarantine laws at New Orleans, we again suffered from Yellow Fever; but yet we had not received into our hospital a solitary case up to the period of its making its appearance in the city. Now, the point is this—Did we receive the Yellow Fever by contagion or by atmospheric influence?

Vicksburgh, 300 miles, and Natchez, 500 miles below us on the Mississippi, both carried out rigid Quarantine regulations at this time, but with no effect. Memphis, with a population of 20,000, situated on a high alluvial bluff, well drained, cleanly in its whole appearance, had never instituted Quarantine regulations.

The facts as to the origin of the disease, I will give you in a few words:

On the 30th day of July, the steamboat "Harry Hill," loaded with railroad iron, from New Orleans, landed at the upper part of Memphis, and while unloading her cargo, next to the "Ingomar," two hands on board of the latter boat contracted Yellow Fever, were brought up into the city, and died, after having black vomit.

The "Harry Hill" then dropped down from her landing, took a cargo on board, and went to New Orleans; she made her trip in thirteen and a half days. While she was gone, the "Ingomar" lost no more hands. On the return of the "Harry Hill," when she landed at the side of the "Ingomar" the disease reappeared on board of the latter boat, and two more cases died. She then dropped down half a mile below, to the lower landing, lost four or five more of her crew, and from

that point, the epidemic spread through the city, as much as Small Pox ever spread through a family. Here is a case right in point, in the facts which could be easily ascertained, and about which there could be no question, that had the "Harry Hill" been detained by Quarantine regulations at President's Island, three miles below the city, we should have escaped the prevalence of Yellow Fever, if we are to take as evidence of the fact, that we had always previously escaped, although we had many cases in the hospital.

I do not wish to detain the Convention by making protracted remarks upon this subject, I wish merely to give these facts, to show that there was something in Quarantine Regulations. Allow me to call your attention to an important point, which I think the report has overlooked; and it is this, that in the farther southern cities, New Orleans, Mobile, Charleston, Savannah, where the Yellow Fever originates, quarantines would be worse than useless; but when you ascend the Mississippi River, and travel far enough North to get out of the region of the Yellow Fever, then you come to points, where the enforcement of quarantine regulations protects the community, and saves them from disease, as is exhibited in this case at Memphis.

Permit me to relate one single fact more, which I think will be interesting to the medical profession. The first cases that occurred in Memphis, were in the old part of the city—the most filthy, most densely populated, and to all human appearance, the most likely to be infected, and where disease would be likely to become epidemic; but such proved not to be the case. The disease which first made its appearance on the Ingomar, and which resulted in the death of three or four of its hands, did not assume an epidemic form. But when the boat Harry Hill dropped to the landing below, the disease then spread into the city, and became epidemic, through that whole region, known as South Memphis, the new part of the city. In reference to these facts, Dr. Shanks says:

That "the epidemic (Yellow Fever,) in Memphis seemed evidently to originate and extend into the city from two points of infection, the packet landing above the new Navy Yard, and in South Memphis, nearly a mile below—remote from each other. From the point above, not meeting with a kindred or susceptible atmosphere in the older and better drained part of the city, only a few sporadic cases were produced, but below in South Memphis, whether it originated there from domestic production or from the boats at the lower and upper landing, it found a most congenial state of the atmosphere in which the infection gradually became developed, and extended over an area of near half a mile in extent, north and south, east and west, and affected most of the families in that district. That efficient causes of peculiar morbid poison, which produced the disease, did not pervade the city generally in any considerable degree, is manifest from the fact, that the most crowded and filthy parts of the older portions of the city, above Union street, and the most crowded and filthy parts of South Memphis, between Union and Pearl streets, near the bayou, though half a mile or more remote from the point of its origin below, were almost entirely exempt from the disease."

The explanation of this in my opinion is just simply this, that in the lower part of the city, they had been recently grading and levelling the streets. There was unquestionably in that section of the city, a predisposition to bilious diseases of a violent type, and the super-addition of the poison of Yellow Fever, to the malaria already existing in the atmosphere, produced Yellow Fever, whereas, in the upper portion of the city, there being nothing of this kind, it was not produced.

Dr. KEMP: May I be allowed to ask Dr. Guthrie, whether there had been any new wharves constructed just preceding this time?

Dr. GUTHRIE: There had been no new wharves, but Gay-

oso street had been graded clear down to the edge of the river, exposing a long surface of new earth, upon which there had been thrown the depositions of filth of that section for years, unquestionably offering one of the most fruitful places for the production of miasmatic or malarious influence.

Dr. KEMP: Had there been any levelling of high ground, or filling up of low places at that time?

Dr. GUTHRIE: There had been at least a mile and a half in extent, of streets that had been graded down, carrying the higher portion of the streets into the lower, and filling up; and this too, at a period of the year, when we were having vegetation almost as luxuriant as a tropical climate could produce.

Dr. KEMP: What kind of soil was thus removed?

Dr. GUTHRIE: Clay and sand mixed. This soil had been in open common. Many of the lots became inundated during the rains from the blocking up of the natural outlets from the drains, and the medical men of the city had presented to the authorities, that the carrying out of this drainage system in the spring of the year, would produce disease in our midst.

Dr. McNULTY: I believe, as I have stated before, that this whole matter of Quarantine is simply a relic of superstition and ignorance. I believe that it has been the means of producing more deaths, ten to one, than it has ever saved lives. I believe that proper sanitary regulations in cities and ports—and when I speak of proper sanitary regulations, I wish to be emphatic upon the word “proper”—administered by competent men, would be abundantly sufficient to protect the community at large, from invasion of pestilential disease from abroad. It has been suggested by a distinguished sanitarian Dr. Reid, of Edinburgh, that there should be enforced rigid

sanitary measures at the port of embarkation, to insure cleanliness, and then you would have a sufficient quarantine to protect you against pestilence. There is no more necessity in my opinion for a quarantine establishment at the entrance of our port, than there would be in having an immense Fire Department at the "High Bridge" to protect our city against fire. If we have any protection against fire, it must be within the city itself; and I believe that with a proper sanitary system in this city, or any city, an epidemic could no more spread, than a fire could spread under a proper and judicious fire system. I believe that we can confine Yellow Fever, if taken into Bellevue Hospital, or any other hospital, within such limits; and I believe that there is no more necessity of its spreading beyond the wards of such hospital, than there is of bilious fever spreading. If you leave filth of all sorts and descriptions accumulating here, as we have had for months upon months, lying in a mass, seething and festering, and loading the breeze with pestilential vapors, which are wafted to the mansions of the rich, as well as of the poor, you will have increase of disease, let it be what it may. I believe that it is owing entirely to the neglect of internal sanitary regulations, that there has been supposed to be any necessity for a Quarantine; and I do hope that the matter will not be laid upon the table, until it has been thoroughly discussed. I see present with us distinguished sanitarians, men familiar with Quarantine, and I trust that they will give us their views upon this subject. I feel that it is almost presumption in me to speak, and I only make these remarks for the purpose of calling them out.

Dr. FRANK TUTHILL, of Brooklyn, had listened to the report with great attention, and found little in it to object to, and very much to approve. It was able and suggestive, and it rode the fence well. But if the radical opinions of Dr. McNULTY were veiled under any of its paraphrases, he should

hesitate to vote for its adoption. This Convention should pause before indorsing any such sentiments, even by implication. Assembled from all parts of the sea-board, men of distinguished reputation in matters of this sort, if they give currency to a doubt as to the utility of Quarantine establishments, they might expect to see the non-professional public early clamoring for the removal of all Quarantine restrictions. Here, especially, commerce is king; and, impatient of all that hinders its perfect freedom, it only asks the medical profession, the sanitary authorities, to tolerate the sentiment that Quarantine is unnecessary, and it will bring all its power to bear for the abolition of every ordinance or law that prohibits infected vessels from coming straight up to our wharves, breaking bulk and discharging cargoes directly on our bulk-heads. That our Quarantine laws had been made unnecessarily stringent, and their enforcement unwisely oppressive, he granted. Still that they had saved Brooklyn and New York from repeated epidemics, must be admitted beyond controversy. Sanitary municipal regulations did not save Brooklyn from Yellow Fever three years ago, when starting at Bay Ridge it spread along the high land, and desolated the very best regulated part of the city. Yet it was directly traceable to the infected shipping, which, in violation of the laws, had come too near to the city. What then might have been expected if the infected vessels came directly up and there was no barrier between the metropolis and the pestilence? Dr. Grossman's statistics, presented on Wednesday, were intended to show how much more important sanitary regulations were than Quarantine, but they still more clearly proved how much Quarantine had done for us. In 25 years Dr. G. said we had lost 33,400 inhabitants from disease engendered in the human body, but in 50 years we had lost only 60 from Yellow Fever, against which mostly we erect our Quarantine barriers. Was doubted that the statistics would have read very differently if we had been without any Quarantine?

Dr. BELL, of Brooklyn :

I unfortunately gave an involuntary shake of my head to my friend as to the limitation of Yellow Fever to Brooklyn, and its introduction consequent upon Quarantine. I do not believe in the total inutility of Quarantine, but I believe, on the strongest possible facts, connected with the epidemic alluded to, that Yellow Fever was introduced into Brooklyn by the Quarantine; that it was limited in its extent to the Quarantine store-houses, and goods stored in them, and to the persons immediately exposed to the *things* of Quarantine. That it did not extend was owing to the paved streets and cleanliness; and the brief prevalence of the epidemic said to prevail in Brooklyn is wholly owing to that fact.

It started on the ships near Pier No. 10, New York, and the first case occurred near the store-house containing goods from Quarantine. There had been ten cases right across the river, on the low streets of New York, before any occurred in Brooklyn. Those were not traced down from either Bayridge or Fort Hamilton. It was sown there, in sandy soil, soon after being started by the fleet of Quarantine ships; and it prevailed on Bay Ridge because the seed was sown in good ground. In Brooklyn, the disease was confined to the neighborhood of the lightermen and the store-houses to which they took goods from Quarantine vessels—some of which were unfortunately permitted to come up and discharge goods in Brooklyn and in New York, right opposite, the width of the river only intervening, before they were discovered to be infected. Those cases have been well traced, and, if necessary, can be named, one by one, with the ships to which they were attached. I was more or less concerned with the Yellow Fever during that period of time—everywhere I could find it in that vicinity. I speak from observations which I made myself, and compared with such as I had made elsewhere, in reference to the prevalence of Yellow Fever. I believe I can safely state, and prove, that no case of Yellow Fever can be cited as existing in that vicinity but what can be traced to Quarantine, goods from Quarantine, or ships and persons connected with it.

Dr. HARRIS, of New York: I have listened with very great interest to this discussion. for there are two sides to this

question, as to almost every other. But, Sir, the questions which have been started in the discussion this morning, need some division. Upon the general question of the utility of an external sanitary or quarantine system for commercial cities in the present state of sanitary science, and general inattention to the laws of hygiene, we certainly must be agreed. The special provisions required at various ports and under different circumstances, may justly be a subject for honest differences of opinion.

There are some statements in this Report of the Committee on Quarantine, which I cannot indorse; but I do heartily indorse the last paragraph of section 2; and I think I do it intelligently. Notwithstanding the weight of those high authorities, "the Committee is not prepared to ignore altogether the importance of restrictive measures, and the enactment of a rational and a judicious code of Quarantine laws."

I believe there is not a gentleman in this room, who, after a fair discussion and statement of the facts and principles involved in this Report, will not indorse that paragraph.

We need to be very cautious in the statements we make respecting individual cases, and the particular epidemics which have occurred in Northern climates, in connection with our Quarantine establishments—particularly in New York: for we have had repeated epidemics of Yellow Fever, very limited to be sure, in their extent, but perhaps more instructive in all their relations than any similar epidemics that have occurred in other parts of the world. That is particularly true of the epidemic that occurred in 1856, at Bay-Ridge, on the Long Island shore, and in the southern part of Brooklyn. Dr. BELL, of Brooklyn, has just stated an interesting fact, if it is true (and I know he believes it to be so, or he would not state it), that *not a case of Yellow Fever occurred in South Brooklyn, which could not be directly traced to infected cargoes*. Well, that is theoretically correct, but no person

has been able to trace the exact history of *all* the cases of Fever that occurred in Brooklyn and elsewhere with such precision as Dr. Bell has stated.

In the vicinity of the Quarantine station, and at various points in the cities of New York and Brooklyn, cases of Yellow Fever have repeatedly occurred, which could only be traced to a general source of contamination of the atmosphere of the whole region, by means of infected vessels and cargoes. For example, a very bad case of the Fever, with black vomit, was brought to Quarantine from a house near the corner of Willow and Orange streets, Brooklyn. That locality is about one-half a mile north from the nearest recognized limits of the district that was supposed to have been infected, and more than a mile north from the warehouses where cargoes were landed from Quarantine; yet that patient had not been south of Orange street, nor had she been otherwise exposed to the known causes of the fever. Similar cases of the Fever appeared, during the same season, in the vicinity of the Wallabout, and at various points on the North River, as far up as 30th and 35th streets.

There are good reasons for believing that Yellow Fever has often spread from infected vessels and cargoes in the port of New York, without the agency of material *fomites*. But this is not a proper occasion for an extended historical statement of the prevalence of the Fever. I have ventured barely to refer to this *terra incognita* in the history of Yellow Fever. Though in New York, we believe its propagating cause to be of imported origin, it is indeed a "pestilence that walketh in darkness."

We quarantine all sorts of vessels, and thereby accumulate and multiply the febrile poison at our great pest embankment, in the Narrows of the Bay of New York; our Health Officers lighter all sorts of cargoes directly to the warehouses of Brooklyn and New York, and with some of these cargoes goes the

breath of pestilence, which refuses to be locked in store-houses. In accordance with usage and law, the infected vessels are fumigated and whitewashed, and still, if really infected, the fatal vomit continues to be the penalty paid by the persons who rashly expose themselves in the apartments of such vessels, until cold weather destroys the activity of the Fever poison; and yet that scourge of the tropics has never become generally epidemic in New York or Philadelphia since those memorable seasons when a tropical temperature and tropical humidity concurred to favor the prevalence of that scourge.

I wish to state, that whatever I may say upon questions that will arise, I will try to say so cautiously, that I shall not be misunderstood. I believe, that while the infection which reached Brooklyn in 1856, did reach it from the infected goods and infected vessels, the Quarantine at Staten Island, imperfect as it was that season, and as it has been for years, did something towards limiting the accumulation and operation of the imported causes of pestilence. (Applause.) Indeed, I would not dare assert that our Quarantine, imperfect and faulty as it was, did not prevent the city of New York from being swept by a pestilence that would have decimated its population. (Applause.) Yellow Fever was in this city, and its causes were here in the form of contaminated ships, infected cargoes; and many persons were smitten with the Fever in consequence of their direct exposure to such vessels and merchandise. But only a part of the contaminated cargoes, and less than a moiety of the infected ships, reached our wharves previous to the cold nights of autumn. And it should be borne in mind, that the entire season was unusually cool and dry.

It is almost universally acknowledged, that the sick of Yellow Fever, in the city of New York, have never communicated that disease to other persons. I suppose those of us who have seen much of Yellow Fever, are agreed upon this sub-

ject. The simple circumstance that a multitude of cases of Yellow Fever may have occurred in Brooklyn and in New York, and still the disease was not communicated, has really nothing to do with the question of the propriety of continuing Quarantine establishments, and strict regulations for the proper control of infected vessels and cargoes.

It is well known to you, Mr. President, and to some others, that I regard our present Quarantine system as exceedingly faulty, but I would not, for my right hand, be the means of preventing the continuance of *proper* Quarantine regulations against Yellow Fever in the port of New York; but Quarantine regulations need to be very different from those that have been established in any of our ports, in order to afford reliable security against the infection of that Fever; and I believe, sir, that in the deliberations of this Convention we may make great advancement towards perfecting plans which may be applicable to all our sea-board towns, with reference to this very important subject.

Dr. McNULTY: In moving the adoption of this clause, I stated that I only regretted that the Committee had not recommended the entire abolition of Quarantine. I do not wish that any odium that may be attached to this expression of opinion, should extend to the Committee. That is my own individual expression of opinion. Of course they recommend nothing of the kind, although they furnish facts enough to show the absolute absurdity of Quarantine.

Dr. BELL, of Brooklyn: Lest I should be misunderstood by Dr. Harris, I wish to trespass further upon the time of the Convention. While I do not believe in the inutility of Quarantine, yet the Yellow Fever that occurred in Brooklyn was traceable to the Quarantine establishment; and further, I would state, that I believe with him as to its doing good service in keeping Yellow Fever out of New York. In proof of this, I would only mention, for illustration, a case that I am very

familiar with. It was a little girl, nine years old, who showed such extraordinary susceptibility to the disease, that I am well satisfied that the only exposure she had was in crossing the ferry, and passing a ship that had been detained at Quarantine when she was being unladen of hides—which may have been the case with others similarly situated. I assert this as one of those casual proofs, to show what may occur to persons peculiarly susceptible, by that kind of exposure; and when I said that the Fever came from Quarantine, and was planted on the sandy soil, I think I qualified it by saying that it was sown in good ground; but when it reached the cleanly-paved streets, and was washed off by the heavy rains which had saturated the sand, and which had been heated by high temperature, it there ceased, and did not extend itself to Brooklyn.

Dr. HARRIS, of New York:

I beg to be indulged in a brief statement upon a single point. While we all complain of the barbarity of our antiquated Quarantine regulations, and of their inconsistencies, perhaps at the port of New York there is more reason for such complaining than at other ports; still it is doubtful whether in any other State there has been so much attention given to the discussion of Quarantine laws, and among the people, in the halls of legislation, as in the State of New York. From 1798, to the present day, the subject has been agitated almost every year, and has been a prominent theme for discussion by almost every Legislature at Albany. And, Sir, it is a rare thing for a new Health Officer—particularly if he comes from the rural districts, entirely innocent of any knowledge of Yellow Fever, or even of its literature—it is a rare thing, I say, for any Health Officer to go to Quarantine, and remain there during his term of two years, without at least bringing down from the capital of the State one new

budget of Quarantine laws. They all tend in one direction; they all look towards the increase of perquisites, and the increase of that personal and political power which is sure to be abused. (Applause.) It so happens that the man who has the shrewdness and political power to obtain that particular office in this State, usually has power enough to get such laws passed as he pleases. It is said that one of the earlier Health Officers of this port used to proceed to Albany, winter after winter, to attend upon successive Legislatures, for the ostensible purpose of securing some humane and benevolent provisions in favor of the St. Regis Indians, &c., &c. Citizens were always glad to believe that the Doctor was looking after something of that kind. But he was sure to return to Staten Island every spring with his pockets filled with new Quarantine and health laws. And so it has been year after year, ever since the time of that good man.

Our Quarantine laws are inconsistent; they are more than barbarous; they are *oppressive*; they are not arranged, in any respect, with reference to the exact and absolute necessities for sanitary protection, much less for commercial and public convenience.

The only rational feature of existing Quarantine laws relating to Yellow Fever, is the regulation for some detention and control of infected vessels and cargoes. We probably all agree in the propriety and importance of such a control; the Report states this point clearly and strongly, but no Quarantine or external sanitary system in the United States, unless it be that of Louisiana, can be regarded as possessing the essential requisites for a system sufficiently protective, or suitably arranged.

To determine when and how the much-needed reforms shall be effected, is the great question before this Convention. Let us examine the Report now before us, and adopt so much as we may be able to agree upon. Let us have suggestions

relative to the warehousing and care of contaminated cargoes, the control and management of infected vessel, and the general regulations of Quarantine to guard against Yellow Fever. Those of us who are medical men need to bear in mind the fact that there are vast interests, personal and public, dependent upon the prosperity of commerce; while those who represent the interests of trade on this floor, will recognize the greater objects of health and public safety.

Physicians will be found nearly unanimous in regard to principles, and those familiar with commercial and nautical affairs, can devise means for carrying the principles of external and naval hygiene into successful operation. The interests of commerce and the safety of the public health, alike demand an immediate and radical reform in the management of infected vessels and their cargoes. At the port of New York, and at most other ports, no suitable docks, warehouses, and general provisions exist for this purpose.

The care of cargoes in Quarantine at this port, has become one of the great prizes of partisan politics, and we rejoice to see in the Report before us, that the shameful abuse of official privileges in the control of such cargoes as Health Officers are pleased to distinguish as infected or *suspected*, has attracted the attention of your Committee.

The lighterage and care of Quarantine goods may now be counted among the partisan political spoils in the Empire State. And the management of that item of Quarantine service has long been such as to endanger the public health, and greatly embarrass and tax commerce. Turn to the Report, and you will find some facts and figures relative to this modern sanitary measure of lighterage, now principally relied on as the means for providing for partisan expenses, and for perpetuating the humbug of Quarantine placeboes, that lull the people into a false sense of security. Let this Convention be prepared to meet these practical questions by the presentation of suitable plans and suggestions at an early day.

The cargoes of infected vessels are now transferred, not to suitable docks and warehouses in an insulated and secure locality, but they are lightered directly to South street and to the Brooklyn stores, where Dr. Bell saw the Yellow Fever he just now described.

Mr. President, I like the spirit of the Report that is before us; it has presented a most interesting *resumé* of historical facts relating to Quarantine, it candidly discusses all the great practical questions in the light of experience, and it manifestly aims at radical reforms in all existing Quarantine regulations. Strongly as it leans in favor of opinions which I cannot advocate, I trust that after a few modifications the Report will be adopted by this Convention.

If it is not designed to discuss the Report *in extenso*, I think we may profitably take it up in two or three sections for adoption, after such discussion as time may allow us to give to it.

I would not weary the Convention with any detailed statement of results of experience at the port of New York. The facts relating to the prevalence of Yellow Fever here are tolerably well understood.

If I may tax your attention for a moment, I should like to refer to a few points in the history of Yellow Fever in 1856, to illustrate the imperfections, the dangers, and the benefits of our Quarantine establishment in the port of New York. Early in the summer, Yellow Fever appeared on vessels arriving at the Quarantine station, Staten Island; and the sick were, as usual, provided for at the Quarantine hospitals, and the vessels were detained, with their cargoes on board, until some ten or fifteen vessels had been detained which were suspected of infection. About the 4th of July the process of lighterage commenced on several of the vessels, and by the tenth of that month, some fifteen vessels had discharged their cargoes at the Quarantine anchorage. Directly to the right,

on the shore of Long Island, Yellow Fever appeared, the first case as early as the 13th of July: those cases appeared in the homes of the wealthiest residents, upon grounds the richest, best cultivated, and most perfectly drained, of any in the vicinity of New York. Those residences were *not in the vicinity of marshes and made ground*; the first, as well as all the later cases of Yellow Fever, appeared where there were no conditions that could favor the occurrence of any malignant fever—particularly Yellow Fever; *but they were directly in the vicinity of those vessels that were known to be badly infected.* The Yellow Fever became planted in this particular locality, and it did not disappear until frost came. The disease spread towards Brooklyn, and from causes which were obvious to Dr. BELL and myself, and other physicians, who were daily visiting those localities. When Yellow Fever appeared upon Governor's Island, it was supposed by many persons that a new fact had been learned respecting the distances to which the infection of Yellow Fever could be spread by simple atmospheric agencies.

The southern extremity of Governor's Island is situated about four and a half miles distant from the nearest point where the more infected vessels were discharging their cargoes: no infected vessel was nearer than three miles. Sixty-four cases of Yellow Fever appeared in the barracks, known as the South Battery, on Governor's Island. The place was in a good hygienic condition, except it was too much crowded; but the disease appeared first in the upper stories of the building within that redoubt. It appeared in rooms as cleanly and better ventilated than this in which we are now assembled. It appeared in apartments that opened to the south and the east, and it appeared just at those points which were most exposed to the lightered cargoes that were continually passing up to the Atlantic Docks, or remaining over night in the immediate vicinity, the Brooklyn storehouses being only separated

from Governor's Island at that point by the narrow stream of Buttermilk Channel. Dr. Bell has just stated that, in studying these facts, he has been able to trace, in every case he saw in Brooklyn, a direct communication with infected cargoes. On Governor's Island the same thing was seen that we saw there—as I believe, the dangerous system of light-erage which has been adopted at this port.

The great defect in the Quarantine system of the port of New York, consists in the absence of proper docks for contaminated vessels and suitable warehousing facilities for infected cargoes. In our deliberations here, we may profitably take into consideration the means for providing for cargoes infected with Yellow Fever, and unless some practicable suggestions can be made relative to this point, we shall make little progress towards improvement in our Quarantine arrangements and regulations for those northern ports, where Yellow Fever is liable to occur. I wish that this report had entered upon this subject more fully. I believe that if we had proper warehousing facilities, we need not embarrass commerce at this port to such an extent as to create any opposition to the most stringent Quarantine regulations that could possibly be required in any season, so far as Yellow Fever is concerned. Before this Convention adjourns, it is to be hoped that we may give this subject special attention. It is hoped, also, that we shall be able to discuss another important subject, viz.: the means of disinfecting ships and cargoes, suspected of containing the infection of Yellow Fever, and other diseases; that when we separate, we shall go home with some intelligent ideas on this subject, and shall leave some intelligent ideas, upon which our Legislatures may act. It is fortunate for the discussions on this subject that the elaborate report of Dr. VAN BIBBER is before us, and that such gentlemen as Dr. D. B. Reid, Dr. Van Bibber, and others, who have given special attention to it, are with us to day.

DR. STEVENS :

MR. PRESIDENT : I fear that our discussions are taking too wide a range to lead to any useful or practical result. As there seems to be, at the present moment, no particular point before the Convention, I beg leave to offer as an amendment to the report, the resolution which I hold in my hand, in the hope that it will tend to concentrate our discussions. I had intended to limit the operation of this resolution to the port of New York, of which alone I have personal knowledge ; but on reflection, I have determined to submit it as a general proposition. If there should be any member of this Convention, from any part of the country, who has seen or known a case, wherein *Yellow Fever* was communicated from one person to another, then we may amend the resolution, and restrict its application to those places where no such occurrence has been known. I see about me delegates from all our great centres of population, where Yellow Fever has prevailed ; professional men of high character, of large and varied experience ; I also see here, laymen of great sagacity, who have been practically conversant with the matter in hand ; men selected as delegates to this Convention, in the hope that they may learn from you, how their respective communities may be best guarded against the invasion of disease. It cannot be doubted, the decision of a Convention thus constituted will be taken as a safe rule of action, the more especially, as the question is presented, as it were unexpectedly, and the decision given, would be arrived at without previous concert. It will therefore be the impartial result of your open deliberations. I do not despair of reaching such a decision, by a unanimous vote. Then you may separate with the grateful consciousness that you have forever disabused the public mind of a grave error ; relieved the Quarantine system of a restriction always useless, and often fatal ; and protected the sick from desertion. The conviction that you have been instrumental in bestowing such a boon upon humanity, will, I doubt not, amply repay you for your attendance here.

On the proposition submitted, I shall make but few remarks, as my wish is to draw forth the opinions of the able men about me, rather than to enlarge upon my own. Firm, however, in my own conviction, I ask your attention for a few moments, while I state the facts upon which that conviction is founded.

In the year 1819, and again in the year 1822, cases of Yellow Fever occurred in the lower part of this city—at Old Slip, on the East River, in the former year, and near Rector street, on the North River, in the latter. In each instance, they were clearly traced to importation. The public authorities—at whose suggestion I know not—erected a fence around what took the name of the “INFECTED DISTRICT,” and caused the inhabitants to be removed therefrom. The sick were taken, and often with their bedding, to other parts of the city, and to our public institutions. In no case was the disease thereby communicated to those about them. It soon became a matter of common observation and daily remark with both the physicians and the public, that no one contracted the disease who had not come from or visited the “infected district.” After a time, however, some fell sick who had only approached that locality. The infected district was then enlarged, and this was several times repeated, until a frost put an end to the disease.

Now, it seems to me, Mr. President, that if a series of experiments had been *devised* by a sagacious philosopher to test the question whether Yellow Fever could be communicated by one person to another, it would be impossible to prove more conclusively that it could not be so communicated, than is proved by the history of the epidemics to which I have referred. Nothing—so far as I know—has occurred during any of the subsequent epidemics to disturb the conviction then formed, that the *poison of Yellow Fever* lurks in *places* and *things*, and *not* in the *human body*, either before or after death.

We have seen that even the bedding of the sick from the infected district did not communicate the disease. We must not, however, infer that such would have been the result, had the bedding been brought from the ship, for such a conclusion would be contradicted by facts, which prove that the poison of Yellow Fever adheres with great tenacity to all porous substances coming from places where this disease originates.

The infected district system has, to a great extent, disarmed Yellow Fever of its terrors to the public in general. Before this system was devised, the whole population were panic-stricken; no one felt secure, although removed a mile or more from the place of danger.

All business was transacted at Greenwich, and thus through an unfounded fear, an arrest was, to a great extent, put upon the most important commercial transactions.

And yet at this very time, so secure was I in the conviction that Yellow Fever could not be communicated from one person to another, that on one occasion, overcome with fatigue, I slept several hours resting on the pillow of one of my patients, who recently reminded me of the occurrence.

So it went on through the season, the disease in one of the epidemics reaching nearly up to St. Paul's Church, its advance being at the rate of some 50 or 100 feet a day.

I had patients near the infected line. I warned them off, having calculated that their position would be a dangerous one, after a lapse of three days. One lady, who kept a boarding-house in Cortlandt street, near Broadway, refused to break up her establishment within the time appointed, beyond which I forewarned her I would not visit her; two or three days afterwards she was brought away on her bed sick, and died under my care in another part of the city.

I now submit the following resolution :

Resolved, That in the absence of any evidence establishing the conclusion that Yellow Fever has ever been conveyed by one person to another, it is the opinion of this Convention that personal quarantine of cases of Yellow Fever may be safely abolished.

Dr. GUTHRIE :

That resolution meets my approbation, because it is something tangible. So far as my experience of Yellow Fever at the South extends, it is this—the same as was stated by my friend Dr. Bell, of Brooklyn. I do not remember to have ever witnessed a case of the conveyance of Yellow Fever by contact of one individual with another. Now I know there are instances that have occurred which give a different impression, and one of these I will relate. In 1853, a brother of mine, residing in New Orleans, had Yellow Fever. He lost a member of his family, and all of them (five persons) suffered

from the attack. In 1855, on his way to my house at Memphis, Tenn., he noticed a gentleman on the steamboat suffering with incipient Yellow Fever. My brother simply remarked to him that he was not a medical man, but had paid a great deal of attention to subjects of this kind, having devoted himself for nearly two months to nursing the sick in his own immediate neighborhood, and thereby acquired what every man who comes in contact with Yellow Fever may acquire—a knowledge of its whole history. My brother said to him, “You are not well?” “No,” said he, “I am not.” He learned that he was a gentleman from Illinois, and had been exposed to the influence of Yellow Fever in New Orleans. He suggested the fact to him that he had Yellow Fever, and much to his surprise the gentleman broke out in terrible anger at his impertinent interference; and created such a *furor* in the boat that they determined to put my brother ashore, because he suggested that Yellow Fever was on board; but before morning the gentleman had black vomit, and before nine the next day he died. As soon as the symptoms of Fever developed themselves, they left him entirely to himself, while my brother went to his state-room. He staid there with him until he died; he then laid him out, took charge of his effects, and consigned him to the shore in a coffin, about fifty miles above there. About five hours from the time my brother buried that man, he was taken with the Yellow Fever. They put him on shore ninety miles from my house, and telegraphed to me that he was dying with the Yellow Fever. I left home the same night and reached there the next day, and went to his room immediately, and although I never had seen a case of Yellow Fever up to that time, I took care of him till he was able to travel, and then brought him to my house. Here was a case where it might seem that my brother had taken the Yellow Fever from contact with the individual on the boat; but on the other hand, I went to him when he was suf-

fering, and did not contract the disease. I will mention another fact: a lady, Mrs. DOYLE—a perfect angel of mercy—who spent two months time at Memphis among Yellow Fever patients, told me that she laid out several Yellow Fever patients of a night, and prepared them for the coffin; taking care, however, to raise the windows; and she went through the whole epidemic with excellent health. So that there is no evidence that I have ever come across to show that personal contact produces Yellow Fever. I have no question that my brother was suffering from the seeds of the disease when he left New Orleans; and very likely if he had not come in contact with the gentleman referred to, he would have taken the disease some time later. This resolution saves us from all questions with regard to Quarantine. I believe that it reaches the very point; for if we can settle the question as to what we shall do with vessels having Yellow Fever on board, a great point will be gained. The case of the HARRY HILL is one of the strongest evidences we have ever had of the necessity of thoroughly purifying a vessel, before she comes in contact with a community, where there is any danger of Yellow Fever spreading. I shall vote for the resolution and amendment with a great deal of pleasure.

Professor GEO. B. WOOD, of Philadelphia, was invited to take a seat beside the President, which he did, remarking that the honor conferred upon him was altogether undeserved on his part.

Dr. LA ROCHE, of Philadelphia:

I think the question before us is simply upon the acceptance or rejection of the Report only, that is, whether Quarantine has fulfilled the objects for which it was intended. I think we ought to confine ourselves to that question.

Dr. KEMP, of Baltimore:

In reference to the amendment offered by Dr. STEVENS, I

would suggest to him with great respect, whether it would not be in place more appropriately when the third specification of this Report comes up for consideration. It seems to me, sir, that the question now to be passed upon by this Convention is simply the abstract fact, whether Quarantines, as they exist, have answered the purposes for which they were originally instituted. The Committee say in their report that Quarantine has not accomplished the expectations of its friends; and another point is, if Quarantines have failed, the Committee were required to submit the reasons of that failure. That strikes me as the only matter before the Convention now. It is not the discussion of the doctrine of contagion or non-contagion. While I have listened with a great deal of pleasure to the remarks which have been made, yet I feel that the discussion is diverging from the true point at issue. The attention of the Convention is becoming drawn away from the point absolutely before it, and I feel at liberty—although I did not intend to say a word on this part of the Report at least—to make this suggestion to the Convention. Inasmuch as my name is appended to the Report, I should like this question to be decided by the Convention on its own merits, uncomplicated with any other considerations that are not necessarily and closely connected with it. There are many facts that can be brought to bear upon the point, as it has been presented by the discussion to the Convention, which would consume a great deal of time, and which we are prepared to offer in support of the views that may be entertained by one wing of the profession on this subject. Our experience is drawn from a comparatively small source. New York is a very great city, and if she fills the eye entirely of the merchants and physicians of New York, I, for one, feel very happy in knowing that there is room in their hearts for us at least; and that we may mention grounds from which conclusions have been drawn on this very important subject. Now, however, I hardly think it is the proper time to discuss that part of the subject.

The abstract question before us, is the question of the success of Quarantines in fulfilling the object of their institution, or their failure to accomplish it ; and as there is a mass of important matter yet to be reached by the Convention, I hope to be pardoned for the remarks that I have made.

A DELEGATE :

I would only observe, with regard to the discussion of this important subject, in this contest between contagion and non-contagion, that some general propositions should be announced to the country which might affect the safety of other places than New York. We are all deeply interested in this matter ; and this resolution certainly has a practical value. It undoubtedly enables the Quarantine regulations to be modified with regard to individuals. It has a practical bearing which the mere announcement of those general theories might not have. It would therefore be more acceptable to those who have business in view, to have definite propositions before them, than to discuss a Report which has already been before the public, and the merits of which can be judged of. I hope the gentleman will hold on to his amendment.

Dr. STEVENS :

I have listened to the remarks of the gentleman on my right with a great deal of pleasure, and they meet my views in another particular. I am not desirous that a resolution of this importance should be passed hastily ; I would rather that some notice of it should be put forth, in order that if in the city of New York, or elsewhere, there be those who are willing to contest that resolution, due notice should be given of it, that the decision arrived at should go forth as *res judicata*. There may be those in the city who may differ from us, and if there be so, let them come here and express their sentiments. If my resolution could be made the special

order at our meeting to-morrow, the fact would go into the papers, and gentlemen would then know that the subject was coming up for discussion. I therefore move that it be made the special order of business to-morrow.

CHARLES H. HASWELL, of New York :

The most parliamentary way would be to withdraw the amendment, and give notice that the resolution will be called up to-morrow.

The PRESIDENT put the question, and Dr. Stevens' resolution was made the special order for the morning session.

DR. GUTHRIE : What do we gain by withdrawing it ? Why not come to the point now ?

DR. STEVENS : There are some contagionists in the city, and I want to give them notice that the question will be considered.

Dr. ANDERSON, of Staten Island :

The object of presenting the resolutions which I hold in my hand, is, that I may vote definitely upon the question. I find the same fault with the report that Dr. HARRIS has done. I think it is not definite enough ; and although Dr. HARRIS indorses the report, I prefer to indorse Dr. HARRIS when he says : " It were well for the sanitary interests of New York if the whole Quarantine system was entirely abolished." If it is not in order to vote upon that question now, I do not understand when it will be, and I offer the following in place of Dr. Stevens' resolution :

" Resolved, That it is the opinion of this Convention that the system of Quarantine as it has hitherto existed in the port of New York, has totally failed to effect its object.

" Resolved, That for the port of New York, all the restrictions necessary are those securing the detention of actually infected vessels, in an isolated situation, during the months from the first of April to the first of October."

Dr. VAN BIBBER, of Baltimore :

I would respectfully suggest that this is a National Convention, and not called to discuss matters affecting the port of New York alone. (Applause.)

The PRESIDENT :

It is questionable whether the Convention will deem the resolution a proper one to be received. If it is left to the Chair to decide, it will decide that it is not in order, in consequence of its being of local application.

Dr. ANDERSON :

I am willing to withdraw that part of the resolution, and make the application general, if desired.

Dr. HARRIS :

This question will come very properly under the third head of reforms, &c., and I believe we shall be prepared to discuss that question when we reach it.

Dr. McNULTY :

It appears to me that the only question that this second proposition involves, is whether Quarantines have failed in their purpose. The matter to be decided is simply whether Quarantine is a life-saving institution—whether it has succeeded in preventing the spread of disease in the city or otherwise. It is my belief that it has not; and it will not be averred for a moment that it has prevented the introduction of Ship or Typhus Fever, or Cholera, by which we have lost in this section of the country ten to one more patients than were ever lost by Yellow Fever. The gentlemen at the South who are more acquainted with the Yellow Fever than we are, are by no means unanimous that Quarantines have been successful in excluding it. The whole ques-

tion is simply, Has Quarantine been successful in excluding disease?

Dr. ANDERSON: If there is any thing in this resolution that makes it sectional, I will strike it out. My reason for applying it to the port of New York, is, because I agree with the gentleman from Memphis, that Quarantine may be necessary for Memphis, but injurious in New York. My experience as an observer of Quarantine in New York is, that it is not necessary; and not only unnecessary, but dangerous. I believe that Quarantine in New York is a manufacturer and intensifier of disease, as many around me from Brooklyn know by sad experience.

Dr. BALDWIN, of New Jersey:

This discussion, Mr. President, is no doubt very interesting; but it is very clear to my mind that we will never arrive at any direct issue, if we go on debating in this way. If I understand the purport of the present stage of the proceedings, we are either to adopt, modify, or reject, this second proposition, offered by the Committee. The Committee have discussed the first proposition, and they have taken one view of it, namely, that the Quarantine system, as it is now regulated, has been a failure. This is true in many respects, but it is not true in all. The Quarantine system cannot be a failure when it takes a vessel with small-pox, and detains it. If you have no small-pox in the city, and you detain the vessel till the cases of small-pox cease upon it, then Quarantine is a protection against small-pox. It is the same with Typhus or Ship Fever. A vessel coming from an European port, with Ship Fever, if it is allowed to land at the Battery, or in the neighborhood of the Battery, and you send four or five hundred emigrants into the State of New Jersey, or Connecticut, you will send Ship Fever into localities where it is not wanted. And therefore

the gentlemen make a failure in their report in this respect. It is the same with every acknowledged contagious disease. Now you propose to discuss here the question of the contagiousness or non-contagiousness of Yellow Fever. This question is not properly under discussion, and it is very clear to my mind that it cannot be discussed at this stage of the proceedings. If the gentlemen had seen fit to say that the vessels, and the cargoes contained therein, should be subject to Quarantine, and the individuals be allowed to go on shore, all well and good; but they have not said that, they have not touched that subject. They have only mentioned Typhus Fever in one instance, in the entire proposition: their whole argument is to show the non-contagiousness of Yellow Fever. Now, they have not answered the latter part of this proposition. They do not touch the question of the location of Quarantine—why the present Quarantine, at Staten Island, is a failure, and why it is an injury to the city of New York. It is very clear to the physicians and gentlemen who reside in New York, that it is an injury to their city, and so it is with other Quarantines; but they do not touch that subject. This is a defect in the report; they have failed to accomplish the object desired in the question. Now, there is also another matter which I think is a proper one to have examined: Whether hospitals, as they are now constructed and arranged, do not form, as gentlemen have stated, *fomites* to increase the disease. I would like to hear an elaborate report upon those subjects. Although I see no objection to us adopting this report at once, still I think the Committee have failed in these matters. I do not profess, Mr. President, to understand this subject myself, but I can see, as a reasonable thinking man, the defects in the report. That our hospitals are defective, and that our Quarantine establishments are imperfect, is apparent to every mind; but that we desire no Quarantines, which some gentlemen have been bold

enough to speak of here as failures, I myself do not believe. I have attended eleven persons sick with Typhus Fever, who were imported into New Jersey from New York, and I took Ship or Typhus Fever, and suffered from it; whereas, I believe, had you exerted a proper Quarantine upon that vessel (which disposed of sixty of its passengers into the sea), had you quarantined her, either with a lazaretto or with a properly located hospital, I should not have had the Ship Fever. As for Yellow Fever, I know I shall never get it until I go where the malaria exists—that, at least, is my conviction from what I have read on the subject, and from what I know of the disease. Although I have never seen Yellow Fever, yet from what I know of acknowledged contagious diseases, we need a Quarantine for them.

DR. KEMP, of Baltimore:

I desire only to say a few words by way of explanation, which may possibly serve to direct the views of the gentlemen composing this Convention. They seem to take up this matter *de novo*. I feel that it is but just that the Committee should be allowed to make an explanation for alleged omissions in the report, and I beg the attention of the Convention for a moment while I try to put the business to occupy the present Convention in its proper place, and proper relation to the business that has been done at the former Convention. We have regarded the consideration of Quarantine by the Conventions that have been successively held, as a continuous movement; that it is not necessary, at this Convention, to discuss questions of fact that were brought forward for discussion in the sessions of the first Convention, unless some of the delegates to this or some future Convention choose to bring up the previous action of a Convention, and pass on that previous action as an error. Now, at the first Convention that assembled in Philadelphia, certain propositions were announced as

facts ; it was presumed that the deliberations upon those statements were then concluded. These have gone forth to the world without having been controverted in the action of the Convention that was then held, and the Committee have regarded them as adopted principles ; therefore, I think, it is not necessary that we should go over and re-discuss them. Now, it may not be known to many gentlemen here, that certain fundamental principles were clearly and distinctly passed upon, and enunciated by the Convention in Philadelphia, in 1857. If you will pardon me, I will read those propositions :

Resolved, That the following propositions be regarded as the sentiment of this Convention :

1. There are certain diseases which may be introduced into a community by foul vessels and cargoes, and diseased crews and passengers.

2. These diseases are Small-Pox, and, under certain circumstances, Typhus Fever, Cholera, and Yellow Fever.

3. When the latter diseases are introduced in this manner, their action is limited to individuals coming within their immediate influence, and cannot become epidemic, unless there exist in the community the circumstances which are calculated to produce such disease, independent of the importation.

4. The circumstances alluded to, consist in vitiated states of the atmosphere, from local causes, in connection with peculiar meteorological conditions.

[Dr. KEMP : We felt at that time we did not know what those conditions were ; that it needed further investigation and an accurate comparison of point. While that Convention felt called upon to pronounce upon certain things, they did not feel at liberty to settle other things.]

5. Efficient sanitary measures, including Quarantine, will, in most cases, prevent the introduction of these diseases, and may, at

any rate, disarm them of their virulence, and prevent their extension when introduced.

6. The present Quarantine regulations, in operation in most of our States, are inefficient, and often prejudicial to the interests of the community.

7. Diseases may be introduced: 1st, By a foul vessel, especially when proper measures are not taken to keep the hold free from stagnant and putrid bilge-water; and more particularly when there exist in the hold drippings or drainage from putrescible matters, which are allowed to penetrate and remain between the timbers of the ship. 2d. By cargoes, consisting in whole or in part of rags, cotton, or like porous substances, shipped from ports at which any malignant epidemic or endemic disease, of a contagious or infectious character, prevailed at the time when the vessel was loaded. 3d. By filthy bedding, baggage, and clothing of emigrant passengers particularly when these are crowded together in insufficient quarters, although the passengers themselves may be free from any actual disease. 4th. By the air that has been confined during a voyage in closely sealed or ill-ventilated holds. 5th. By squalid and diseased passengers landed and crowded together in unhealthy neighborhoods, or in small and ill-ventilated dwellings. 6th. By passengers and crews who are actually laboring under or infected with any positively contagious disease, and their bedding, clothing, and baggage.

8. To prevent, therefore, the introduction of disease from the several causes enumerated, the necessity is apparent of providing a system by which all parts of a vessel may be ventilated during a voyage; and for the careful inspection of all vessels immediately upon their arrival, and before they are allowed to come up to the wharves of a city, for the landing of their passengers or the discharge of their cargoes. No vessel, arriving between the first of May and the first of November, should, in fact, be admitted to a port until her hold is freely and fully ventilated, nor until the bilge-water is entirely removed.

9. Provision should be made for the immediate landing of all those portions of the cargo of a vessel, and the baggage and clothing

that may be judged capable of generating or communicating disease, and for their proper purification, at such places and under such regulations as shall preclude all danger of their exerting a morbid influence, either immediately, or upon their subsequent admission into the city.

10. Provision should be made for the immediate landing from on board of vessels as they arrive, of all persons who are actually laboring under disease, and for their due and comfortable accommodation and treatment, until such time as they can be taken charge of, and properly cared for by their friends.

11. In the case of a ship-load of squalid passengers, or those strongly predisposed to disease, their clothing, beds, and other effects, should be at once subjected to a thorough ventilation and purification, and upon their landing, adequate measures should be adopted to prevent them from crowding together, in confined, unhealthy, and ill-ventilated dwellings and localities.

12. When a vessel arrives in a foul condition, or on board of which disease has prevailed during the voyage, after her crew and passengers have been removed for her, she should be subjected to a thorough process of cleansing and purification; for which purpose it may be necessary to discharge her cargo at a safe distance from the city, and to allow only such portions of it to be conveyed there as are incapable of creating disease, the residue being subjected to ventilation in such a manner as shall prevent it from suffering damage and all avoidable deterioration.

13. The carrying out of these provisions should be intrusted to a single officer, with such assistants as may be required to aid him in the performance of his functions.

14. This officer should be a regular physician, of unquestionable talents and experience, and possessed of great decision and rectitude of character.

15. His compensation should be sufficiently ample to enable him to devote his entire attention and energies, throughout the year, to the duties of his office.

16. While the power of removing him for incompetency, neglect

or other adequate cause, should be vested in some competent tribunal, his appointment should be based solely upon his capacity to fulfill satisfactorily his incumbent duties, and his continuance in office made dependent upon his faithful and skillful discharge of those duties.

17. To this officer should be intrusted the sole and entire decision, under certain general provisions established by law, as to the treatment required in the case of each vessel that shall arrive, and of its cargo, crew, and passengers, and to place it and these in a condition to prevent any danger of the introduction, by them, of disease; he, at the same time, being held to a strict accountability for the manner in which the discretionary power thus confided to him, is executed.

18. As in every community, a Board of Health is necessary to watch over its sanitary condition, and to prevent or remove all domestic sources of disease, this body would appear to be the one in which the power of appointing, and the general supervision of the official conduct of the Quarantine Physician, may, with the greatest propriety, be invested.

19. With a view to procure an uniformity in Quarantine regulations throughout the several ports of the United States, the assembling of another and probably several Conventions similar to the present one, will be required.

20. To provide for the assembling of such a Convention in 1858, it is suggested that the President, Vice-Presidents, and Secretaries of this Convention, with a Committee of one member from each State represented in the Convention, be continued after our adjournment, as commissioners for the purpose of taking the necessary steps for the call of a Convention next year; *provided, however*, that their power shall cease immediately upon the assembling and organization of the Convention of 1858.

21. A thorough examination should be made of all immigrants on their arrival; and if they are not protected against small-pox, they should be vaccinated.

22. We recommend that there should be attached to our Boards of Health and Quarantine establishments, stations for minute

meteorological observations, and vaccine establishments, and that records of these be published at stated periods, for the public benefit.

23. We advise the introduction of increased comforts for crews and passengers, and the ventilation and purification of vessels by a more effectual method.

This was the enunciation of the first Convention. The second Convention was called to meet last year in Baltimore. There had been no committees appointed, and no business prepared by the Convention in Philadelphia, to occupy the consideration of the Convention in Baltimore. A motion was made last year to appoint a Business Committee, which was adopted, as those of you who have the report of the proceedings at Baltimore will see. Two Committees were appointed; one to take up the consideration of those points that are mentioned here on the first page of the report of the Committee on Quarantine, and another was to take up the subject of internal hygiene. The aim of that Convention and the one that preceded it, the thing at which they hoped to reach, was this: that by calling attention to the importance of the internal sanitary arrangements in cities, the unnecessary severities of Quarantine would be ameliorated. We have all believed that internal hygiene is the thing that is most neglected. Well, in accordance with that, the Philadelphia Convention laid down certain definite and distinct propositions, as the ground upon which to build, and the result is the presentation of the report that has been offered to-day. It is proposed to open those old discussions, and consider that question in the report of the Committee, which says, that Quarantines have not accomplished what they were designed to accomplish. You see the latitude that the discussion is taking; it is going to bring the whole thing up from the beginning, and if we do that, we will never get through. We had four days' meeting in Philadelphia, two sessions each

day, and animated discussions from the beginning to the end; and now, sir, if this Convention is going over the whole of that ground again, we will not get any further than the Philadelphia Convention. Let us take these propositions as true; let this Convention adopt them; or else, let them take up a new proposition, under the third head, "What reforms are required to make Quarantines more efficient and less burdensome?" Then will be the time to discuss any new propositions that may come up, and not now. I merely make these remarks, so that we may hurry on with the business. (Applause.)

Dr. STEVENS:

I do not desire to be troublesome, or to speak unkindly, but I must take leave to say, with deference to the Conventions that have preceded us, that in my humble estimation, they have not laid a solid foundation upon which we can proceed for the furtherance of our business. The radical defect in that Report, in my view, is, that it attempts an impossibility. It attempts a generalization of Quarantine measures—preventive measures for four diseases together, diseases that require each its own specific treatment, and which behave entirely different. Taking up Small-Pox, Cholera, and Yellow and Typhus Fever, and talking about them altogether, is very much like our discussion—for we have been talking about every thing together this morning. What we want, gentlemen, is this: a report which will specify exactly what Quarantine measures are necessary for Yellow Fever. That is one thing. Then we want a report to state what Quarantine measures are necessary for Small-Pox. We want to consider whether any Quarantine measures can be made efficacious for Cholera, and if so, what; and so with Typhus Fever. Unless we do that, we will get into inextricable confusion.

The PRESIDENT:

Will the gentleman allow the Chair to state, that the Con-

vention has not the whole subject before it yet, for investigation, in consequence of the fact, that the third proposition in this report is not presented for discussion? Without presuming to know what it contains, it will probably furnish the answers to the suggestions which Dr. Stevens has made. The third proposition is, "What reforms are required, to make Quarantines more efficient and less burdensome?" Perhaps the Committee have presented in the pages referred to, the reforms which are sought for by the speaker on the floor.

Dr. REID, of Edinburgh:

Though, as a stranger, I cannot pretend to be well acquainted with many of those subjects that are familiar to many of the gentlemen here, there are some points connected with this question that have attracted a good deal of my attention, and if you will permit me, I will offer one or two observations upon that point, to which conversation has been more specially directed during the last half-hour. It will be observed that the object, (if I understand it aright) of a Convention such as this, is the improvement of Quarantine. We have received the reports of Committees, which give a *resumé* of the general position of the question, but these, however ably drawn up, and however thankful we ought to be to the gentlemen of the Committee who have penned them, are not necessarily binding upon the members of this Convention; and that they, I presume, look to a stage further, in order to advance their action on the subject, which is desirable both for general and local purposes. It does appear to me that we are coming to the conclusion, that it would be desirable to throw open the whole subject in the first question. It is exceedingly embarrassing to be tied down to a special point, when the most of us do not know how much is embraced in it, how much might come up in the next point, and how much in the succeeding points, affecting that very question which was brought forward

for immediate vote and adjudication. If this be the case, and if the whole subject be thrown open so that each gentleman will have an opportunity to offer something new, we shall see what materials we have; and then giving some limited time to the general discussion under such regulations as may be prescribed, it would be most desirable to have a Committee to draw up a report (I do not mean an elaborate report as we already have here), but certain resolutions; after which they could be presented and discussed in the meeting in full. It is desirable that a ship should be ventilated, that passengers should be detained, and also that vessels should not be crowded. Such things should be looked to at the port of embarkation, and the proper precautions should be made at the port of arrival. In that way we shall come practically to see what are the great *desiderata*, what the points in which we might agree, and where the subject may be developed. It appears to me the subject might be generalized very much, and put upon a kind of international or cosmopolitan footing, because it is an object of very great importance, not only that individual States should concur with what was desirable, but as you deal with the commerce of the whole globe. If possible, the thing should be so agitated, that such arrangements would be made as would promote the general public health at any and every port. If you look to Boston on the one hand, and New Orleans on the other, and determine upon such regulations as can be applied and enforced at these ports, they might be sufficient also for all general cosmopolitan purposes, and then you would be enabled to obtain the assistance (if such assistance could be obtained) that foreign governments could give, and that such governments would also expect from this country. You will observe that this question is not a local one; it is a string, which, like all other strings, has two ends; and you must pull at the port of embarkation, as well

as at the port of arrival, in order to know what is necessary at the one, and what is to be excluded at the other. If the diseases treated at Quarantine were like a disease of a peculiar character, that arose somewhere, no one knew where, presented itself at the port, and were to be judged and determined by Quarantine arrangements at the port of arrival, then Quarantine at the port of arrival would be the only subject of consideration; but if you are to be guided in what you do by the extent to which you are supported by hygienic measures and proper precaution at the port of embarkation, it is quite clear that any thing that interests States, that point which unites the several members of this Convention from different parts of the Union, must also equally apply to and interest those who see the connection and relation of foreign governments to this question. If we look to infectious diseases, we shall see that the chemistry of modern days has unfolded innumerable points connected with this subject, one of the greatest of which is, What will destroy all materials, such as will produce contagion and its effects? As we wish to arrest it at a port where Quarantine measures are enforced, we should understand the relation of chemistry to Yellow Fever; for water and heat each have their influence. Hence I would say, if we admit these things, and if we admit what has been so freely referred to lately—that we must have Quarantine, to arrest disease, where a ship comes crowded with it—the grand object will be in considering this Report, to first thank the Committee for what has been done in relation to the general exposition of the history of the question, and then to advance to the next point, What reforms are required to make Quarantine more efficient and less burdensome? If you will allow me, I would suggest that the whole question be opened, and after a general discussion upon the whole question, then it would be very desirable to have a sub-committee appointed, to draw up certain resolutions for the general approval of the Convention. (Applause.)

Mayer RODMAN, of Providence:

The range and drift of the discussion have seemed to make it my duty to say a single word. It strikes me, if we are to accomplish the purposes for which this Convention was originally instituted, that we should keep steadily in view its national character; that if possible, we should act upon the platform of a united purpose, and as far as we possibly can, we should avoid the centralization of the question, giving it a broad and national character. We should remember that we are here representatives of the family of States, and avoid every thing that looks like an expression of personal opinion, or reflection upon States or individuals. I would therefore move that the two subjects, which have taken so wide a range, be severally recommended to the Business Committee of the Convention, in order that they should take them into consideration, and after having analyzed and separated them, then recommend to the Convention those subjects which should specifically come before it. Then each State might be called upon to give its own experience in regard to the local operation of these matters, and after each State has given its expression as a State, we might discuss it on the broad issue. By taking that view of the subject, we can act in the spirit of the Convention, and perform the objects for which we have been called together.

Mr. NELSON, of the New York CHAMBER OF COMMERCE:

It seems to me that this discussion ought to be general. If the Quarantine law is required to be harsh and oppressive in one place, it ought to be made so in another. I know from my own experience that it is oppressive. I believe that where it is less oppressive than it is in New York, Quarantine is quite as effective, and more so. I will give you one instance: Last summer I had a ship loaded at New Orleans for Boston; on the way she lost two of her crew by Yellow Fever. When

she arrived in Boston, she was detained below for two days; then she was permitted to go to the city and discharge her cargo. There was no case of Yellow Fever on board. After that she left Boston and went back to New Orleans. If that ship had come to New York under similar circumstances, losing two of her crew, she would have been kept in the lower Bay, and the whole of her cargo discharged there at an enormous expense; and after she got all of her cargo out, she would be detained. I believe there is a little humbug about this Quarantine, to tell you the truth. Last summer I was sitting in front of the Doctor's office at Quarantine, waiting for him to come ashore, and I saw a poor sailor that looked very sick. I thought he had the Yellow Fever, and I asked him if he had it. He said "No," that he had arrived there a short time before, with a sore leg, and the first thing he knew, was, that he was put into a Yellow Fever ward. He remained there for a day or two, until he convinced them that he had not Yellow Fever—then they let him out. When I saw him, he got permission to leave the Hospital altogether, but the man at the gate would not allow him to pass through until he procured a ticket from the physician. There ought to be some uniformity about this matter. I believe if the different cities were kept clean, there would be very little occasion for Quarantine. (Applause.)

Dr. JEWETT:

As a member of the Committee, I should decidedly object to Dr. Reid's proposition. The whole subject has been before the Business Committee, for a limited time, and as the result of that reference, they have presented to the Convention certain points for their consideration. It was thought that the opinions of the Convention on the subject of Quarantine should be expressed, by discussing the second and third propositions. The second proposition is simply, that Quar-

antime regulations have failed of the object for which they were intended. Is there a gentleman in this room, is there a gentleman in the profession, that will come forward and say that Quarantine regulations have accomplished the object for which they were instituted? I do not believe there is one. (Applause.) I believe they have done something; I know they have accomplished something. I feel the importance of Quarantine regulations, but as they have existed, they have been oppressive to the community. Now, the subject before us, just at this moment, is nothing more than to answer the question whether they have, or have not, done that for which they were originated? The Committee, in their report, are eminently conservative; there is a strong leaning to the opinion that they not only have not done that which they were designed to do, but that they have done little towards it, and in some cases have been injurious to the cause. Now, if the Convention are ready to act (and I believe that the large majority are conservative in their opinions on the subject, and that they are willing to agree to every thing stated in that second proposition), why not vote upon it immediately? It may not be all that some individuals require and desire, but they cannot find any fault with what is stated. For my own part, I concur entirely in the views presented there; and if we want to move forward in this business, if we want to complete our labors, we must take one step towards it, and pass the resolution. By adopting the views of that second proposition, we then come to the third, which is a much more important one, and there a wider range can be given to the discussion. The discussions that have been held now, refer vastly more to the third than to the second question. Are the gentlemen ready to say that Quarantine regulations have failed, and if they say so, they have only to vote affirmatively on the subject.

Dr. JONES :

I desire to call the attention of the Chair to the division of this question. I understand that the motion which has been offered and entertained by the Chair is, that this whole subject be referred to the Business Committee. Why, it has been so referred, and they have come back to this Convention, and reported that there are two propositions, the second and third, in the printed Report, which should be the subject of our discussion to-day. That is the precise question at issue. I respectfully submit to the Chair that any other motion is out of order, until some disposition be made of these two propositions. It seems to me that these propositions are legitimately before the Convention, and that these are the questions to be disposed of. As yet, very little reference has been made to them.

The PRESIDENT :

The Chair will observe, in reference to the remarks just made, that the question first before the Convention is simply the adoption of the report. Mayor Rodman moves that the subject be referred to the Business Committee, for the purpose, as the Chair understands it, of presenting resolutions specific in their character upon this subject. The Chair would further observe that this report contains no distinct proposition, unless the two lines on page 53 be considered as such, which read as follows :

“ A judicious modification of the present unsound, ill-advised, and antiquated code of Quarantine laws is therefore absolutely necessary.”

The question before the Convention is the substitute offered by Mayor Rodman.

Dr. CLARK, of Boston, moved to lay it upon the table
Which was agreed to.

The PRESIDENT:

The question now recurs upon the original proposition to adopt the second part of the report.

The question was then taken, and being decided in the affirmative, the second proposition was accordingly adopted.

The SECRETARY then read the third proposition, commencing at page 54, and ending at page 62.

Dr. GUTHRIE, of Tennessee:

I will detain the Convention but a moment, and I will be very brief in the statement which I desire to make. The whole question and subject of discussion this morning has turned in the minds of many gentlemen in this Convention, as I understand it, upon this one point, however much we may have wandered from the point at issue, and however much we may have differed, viz.: whether this Convention is prepared to say that Quarantine is a failure. Now, in the proposition before the Convention at this time, the question comes still more closely home to those who are not prepared to take that position, for as I understand it, if the Convention adopt the report as it now reads, they adopt these words:

"Now the Committee candidly confesses that it knows of no existing system of Quarantine that can be esteemed correct in theory, or calculated to secure any beneficial result in practice."

There is the gist of the whole thing, upon which this discussion has turned this morning. Here I confess myself to stumble right over this point. While I acknowledge that it has failed to do all that it ought to do, and that it ought to be modified, amended, and corrected, I am by no means prepared to say that the calls of commerce shall not yet be made subservient to the calls of public health (applause); that the commercial prosperity of New York, New Orleans,

or any commercial city, shall override the health and comfort of families, and of the community at large.

Dr. HARRIS :

I am sure that Dr. Guthrie will find many in this Convention who fully sympathize with him in respect to that particular paragraph in this Report. In all essential respects, other than that, this Report has been drawn up with great care. It has discussed a great many important practical points, and has put them in a shape which can be well appreciated by all men. I regret that these words appear there, and I am glad that we have an opportunity to hear gentlemen express themselves upon that particular point. The language, I conceive, is stronger than the Committee really intended to use ; and after gentlemen have discussed that point, I intend to move that the Report be amended in that particular. I have seen nothing else that comes in collision with the opinions which I myself entertain.

Dr. JEFFRIES :

I do not see that the Committee in their report have done that which has been complained of. The gentleman (Dr. Guthrie) says that he finds fault with the Committee, because they make assertions that quarantines have not performed that for which they were intended. The Committee do not say that. They say this : "The Committee candidly confesses, that it knows no existing system of Quarantine that can be esteemed correct in theory, or calculated to secure any beneficial result in practice."

I ask the gentlemen, Can they furnish the Committee with any such system, as the Committee say they do not know of any ? I know of no one system that is called a system of Quarantine. Quarantine systems and Quarantine regulations are as diverse as the different ports in the world, and there

is no system of Quarantine ; and therefore the Committee are perfectly right when they say, that they know of no system of Quarantine that has answered its purpose. I find, therefore, no fault with this expression ; but I do say, that the whole tenor of this report is exceedingly good, and it must commend itself at least to the large body of professional gentlemen connected with the Convention.

Dr. GUTHRIE :

I dislike very much to be personally appealed to in this matter, but I do not think I have taken my position in regard to it without some consideration. I ask gentlemen to read that report, and then answer me honestly, if it does not contradict itself in less than three pages afterwards ? On page 59, they say :

“ Now, it is not believed that all this may be prevented, nor that the necessity of proper precautionary measures in respect to all vessels coming from unhealthy and infected ports,” &c., evidently going to argue in favor of some precautionary measures. I will not pretend to say that Quarantine has been what it ought to have been ; but the gentleman who addressed us with regard to the effect of Quarantine and the dissemination of disease from the Quarantine in Brooklyn, gave the facts, *verbatim et seriatim*, which proved conclusively, that if you had had no Quarantine at Staten Island, you would have had Yellow Fever at Brooklyn and New York. There was no other interpretation of the facts which he gave, because he went on to say, that the whole number of cases of Yellow Fever were traceable to Quarantine and infected vessels. If you had had no Quarantine ; had these vessels been suffered to come to the city, broken their holds, and discharged their cargoes ; and had their crews been dispersed through the city, the disease would have spread, and with a condition of the atmosphere

favorable to it, you would have suffered in Brooklyn and New York from Yellow Fever, as we did in Memphis. Here was a case where the existence of Quarantine was promotive of good. I am unwilling that the Convention should say that they know of no system of Quarantine good in theory. The gentlemen may call me to account, and ask me to set forth a system. I am not going to undertake to set forth a system of Quarantine. I am only referring to existing Quarantines as known to the community and this Convention. If you may call them a system, very good. If you call them not a system, then my argument goes for nothing. If they are entitled to be known as the system of Quarantine, then every intelligent gentleman should concede the point that they have done some good; and consequently to adopt that portion of the Report that they have done no good, is to adopt that which some of us cannot subscribe to.

Dr. McNULTY :

Will the gentleman name any port, where they have any correct theory?

Dr. GUTHRIE :

No, sir.

Dr. McNULTY :

That is the whole point in controversy.

Dr. GRISCOM (Dr. Nichols, Vice-President, in the chair):

I fully concur with my friend from Memphis, Tennessee (Dr. Guthrie), that the language of the Report as quoted is entirely too strong. The word "any" covers a vast deal of ground. "They know of no system of Quarantine calculated to secure *any* beneficial result in practice"—no language can possibly be stronger. Now, to tell us here in New York, that our system of Quarantine, badly, I might almost say

infamously, as it has been sometimes conducted, has had no effect whatever in keeping Yellow Fever out of the City of New York, is traveling a great way beyond the truth. Why, there is not a year that passes in which the Yellow Fever miasm is not brought to this port at Quarantine by the ship-load ; and yet New York is free from any infection. Is it possible that there would be no spread of the disease if you were to admit these vessels to the wharves of the city, to break bulk, discharge their cargoes, and allow all the *fomites* which we know to exist at Quarantine, to come directly into the heart of the city ? It is impossible to suppose it ; and therefore we say that a system, bad though it may be in other respects, which keeps a vessel infected with Yellow Fever at a distance from the city, with a perfect cordon of officers, will prevent any increase, as it has the effect of preventing the extension, of disease from within the vessel to the exterior. I say, then, that the language of that Report is entirely too strong, and that whole paragraph should be stricken out. It will not do for this Convention to go before the world, and say that all Quarantines, from time immemorial to the present, have failed, which is in fact the language of the Report.

Dr. LA ROCHE, of Philadelphia :

Here is another objectionable paragraph on page 55 :

"Every system of Quarantine which fails in the accomplishment of the only legitimate object of its institution, can be viewed in no other light than as a grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea that it is necessary as a prudent preventive measure. From an inefficient or a badly and imperfectly administered Quarantine, no possible good can result. It is simply an arbitrary curtailment of the freedom of intercourse and of trade, without any equivalent good to justify its infliction."

This is a very unguarded expression to send all through the country.

Dr. GAZSCOM :

I would take this opportunity to make a remark which I intended to have made before, upon another paragraph, in that part of the Report which was adopted this morning. It is a historical error ; and I will allude to it, as it comes in connection with my present remarks.

On page 46, there occurs this paragraph :

“The establishment of the first Quarantine in that city (New York), took place in 1758 ; since which period, Yellow Fever has made its appearance there in no fewer than sixteen different years, during which Quarantine was faithfully maintained.”

Here is a most marked and decided error. It may be true, that the establishment of the first Quarantine in the city of New York was in 1758 ; but it was not until 1805, that any thing like a rigid Quarantine was established here. Vessels were allowed to come up to the wharves of the city before the Health Officer boarded them. There was no such thing as a Quarantine establishment at Staten Island ; and at that time there were no such laws in force, as we now have. In the thirty-four years prior to the year 1809, the city of New York had seventeen visitations of the Yellow Fever. In 1804, a law was enacted, for the first time, prohibiting vessels from coming nearer than three hundred yards of the city. It was only in 1805, that infected vessels were prohibited from coming within three hundred yards of the island of New York, while the law of 1806 restricts vessels from the West Indies and the Mississippi, to four days' detention at Quarantine. This applied to all vessels, whether they had Yellow Fever or not. At that time, and subsequently to 1806, Quarantine began to take its present efficient shape. It was then made quite rigid. The Health Officer was bound by certain rules. Be-

fore, he was limited by his own discretion ; but now he was bound by laws. Prior to 1809, during thirty-four years, as just stated, this city had seventeen visitations of Yellow Fever ; while, with a rigid enforcement of Quarantine laws, at this port, we have had but two visitations of the Yellow Fever in the thirty-four years since 1809.

Dr. STEVENS :

We have had Croton water since that time.

Dr. GRISCOM :

But Croton water does not keep out Yellow Fever. We have had it at the Quarantine station almost every year. Why has it not visited the city ? I should like to have that question answered by those who believe that Quarantine has no power to keep out Yellow Fever. Intercourse between the city of New York and southern cities has greatly multiplied. Before 1809, the frequency of intercourse between us and the West Indies was trifling in comparison with what it has been since 1822, when our last visitation of Yellow Fever in the city occurred. But in 1856 we had perhaps as large an importation of the miasm as we have ever had since 1809. About 80 vessels lay with it at Quarantine at one time ; and about 500 cases of Yellow Fever occurred there and on the eastern end of Long Island, from Fort Hamilton up Bay Ridge to Brooklyn. Some 50 cases were introduced into the city. Twelve cases were brought to the City Hospital, one or two of which were under my own care ; ten of the twelve died. Two cases were not accounted for, I believe, being removed by their friends. Under all these circumstances, with 500 cases occurring at Quarantine or in its vicinity, with 50 cases introduced into the city of New York, surreptitiously or otherwise, the fever did not spread here. Not a single case is reported to have occurred, except such as could be traced directly to in-

fectious vessels or districts; and yet gentlemen tell us in the face of all this, that Quarantine restrictions do not prevent the disease coming here. How did the disease spread upon Long Island to such an extent, and devastate portions of New Jersey and Staten Island, and yet did not occur to any greater extent in this city? There must be, as I maintain, some condition of the atmosphere, which is congenial to the growth and spread of the Fever. Whether the New Orleans theory is a correct one, is not a question for us to determine. But in that theory there is a great deal of philosophy embodied in the facts which are presented.

DR. STEVENS:

State, if you please, the New Orleans theory.

DR. GRISCOM:

The New Orleans theory is, that there are required in the atmosphere, in order to promote the developement and extension of Yellow Fever, two circumstances—a high temperature, and a high degree of moisture.

DR. STEVENS:

To that must be added certain terrene influences—such as the removal of earth.

DR. GRISCOM:

Terrene circumstances are necessary to its *origination*, according to the New Orleans philosophers—an idea which may be correct as far as that city is concerned, but wholly inapplicable to New York, where, in my opinion, it has never originated from domestic causes, and has never been known except by importation. But as to the correctness of the other branch of the New Orleans theory, of the required combination of certain atmospheric conditions, to enable the poison to take

root and spread amongst us, we had strong evidence in 1856. On examining the meteorological register at Fort Hamilton, where the disease first appeared on Long Island, in that year, it was found that the atmospheric circumstances were almost precisely concurrent with those which were found at New Orleans, during the prevalence of the Yellow Fever there in 1853; that is to say, the temperature of the air in July was 79° to 80° , while the temperature of evaporation was 76° and over, making a degree of dryness, as it is technically termed, of 3.72° . In August the degree of dryness was 5.12° . Such was the atmospheric condition during that severe epidemic at New Orleans. At Fort Hamilton, in 1856, the degree of dryness in July was 4.76° , and in August it was 5.03° . In these two instances, there was a remarkable coincidence. The question arose, Why did not the city of New York exhibit also the aptitude to Yellow Fever, which was exhibited at Bay Ridge and Fort Hamilton? The answer was obtained by an examination of the meteorological registers of New York, which revealed a very different state of things. Instead of there being a degree of dryness of 4.76° , we found it $8\frac{1}{2}^{\circ}$, nearly double that at Fort Hamilton. The reasons for that difference might easily be explained. I account for it upon the ground, that a huge paved city has fewer sources of moisture for the atmosphere to take up, and that the heated bricks and stones dissipate the moisture, and the air is less liable, therefore, to serve as a Yellow Fever promoter. This idea may be subject to criticism; but there we have the fact, that the degree of dryness in New York was nearly double that which existed at Fort Hamilton, notwithstanding their proximity to each other. And in these facts, and the exemption of this metropolis from devastation by the fearful disease, which then so closely threatened us, do we find the most powerful argument for the exercise of the most thorough civic and domiciliary cleanliness and dryness.

To recur again to the original suggestion, that this Report expresses, in entirely too strong language, the idea that Quarantines are ineffectual—as I stated before, we have had Yellow Fever every year at Quarantine; but not once has it been prevalent in the city since 1822.

MAYOR RODMAN: I rise to speak of the practical bearings of this report. I will detain you but a moment. I appeal to the gentlemen of the profession, in the light of humanity, to do nothing rashly. Let us legislate on this point with a great deal of care. You know, gentlemen who are connected with this metropolis, who are connected with the commercial cities of the United States, that our merchants are exceedingly sensitive on the subject of Quarantine. Perhaps in the practical administration of a municipal government, the Mayor finds nothing outside of the details of ordinary service, where there is so great a pressure brought to bear upon his administrative power, as the matter of the Quarantine laws. You know that it assails the pocket at once. A vessel comes into the river or the bay, and she is checked by the Quarantine laws, having, perhaps, a commodity on board that is very much desired by all the community. The price of that article has suddenly taken a rise in the market—a fortune lies within that vessel; but the Quarantine law prevents any action being taken in regard to supplying the public with that article. The question arises, What is the use of this Quarantine? Here is a practical point which I wish to bring to bear upon you to-day. I have nothing to say in regard to the merits of the question, because I do not know any thing about it. I only ask you who are informed with regard to the subject, Is it prudent to indorse such language as the President read, found in the last section of the 55th page? Let us suppose for a moment that we are a City Council, and the question under discussion is the Quarantine laws. All the city governments of the United States, connected with sea-boards, are

looking to this Convention, toward the Reports that will go broadcast over the country as the expression of this convention in regard to this great and important subject of Quarantine. The first question they will ask, is, "What say this Convention—a body composed of the best medical talent in the United States? They have had an opportunity to investigate the whole subject; they have looked at it in all its bearings; they have received the question a year ago to answer; they have calmly, coolly, and deliberately presented this as their answer to the commercial cities of the United States, after having subjected the whole matter to the most rigid analytical investigation."

Let us imagine a member of the City Council rising with this Report in his hand and reading these words: "Every system of Quarantine which fails in the accomplishment of the only legitimate object of its institution, can be viewed in no other light than as a grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea, that it is necessary as a prudent preventive measure."

And then let him read in connection with it, these words: "Now the Committee candidly confesses that it knows of no existing system of Quarantine that can be esteemed correct in theory, or calculated to secure any beneficial result in practice."

I ask you, gentlemen, is there a city council in this country, with this pressure from the commercial interests resting upon its members, that would not almost unanimously say, "If this is the deliberate opinion of the medical men of this country in a Convention centralized in New York, where all the experience of that great city is brought to bear in connection with all other cities, if this is their conviction, it is our conviction, and we will abolish our Quarantine laws at once"? I turn to you, gentlemen, in the name of humanity, and ask you, Are you willing to adopt a sentiment like that? Does not your own experience prove to

you that these guards have saved this country from pestilence? I throw out these hints to the Convention for what they are worth; I feel that I need say no more; I feel that I must speak practically from my own observation.

Dr. WORKMAN, of Troy: Before the second proposition was presented, I had frequently desired to give expression to some remarks, but I saw that it did not involve the whole subject. I read the Report with a great deal of care last night, and marked portions of it, that I found did not correspond with my views; I intended to bring it with me, as a guide, but unfortunately I left it at my room this morning. Yellow Fever seems to be the particular theme of discussion at this time, leaving out the other acknowledged contagious diseases. So far as I can judge of the sentiments of this Convention, composed of medical and commercial men, there seem to be two views taken upon a very important subject, and the people of this and the other States of the Union, knowing the character of this Convention, and the purposes for which it assembled, look with some anxiety to the result of your deliberations. The medical profession are looked upon as conservators of public health; and the commercial interest is another interest, separate and distinct from the professional. It seems to me from all the arguments that I have heard this morning, that Yellow Fever is an infectious disease, springing up in certain sections of our country. The city of New Orleans has been alluded to as a point where it is supposed that almost generally it takes its origin; the combination of circumstances alluded to by the President, does not exist to the same extent every year. I will take this occasion to say that I resided there during part of the years 1823 and 1824. It is a peculiarly located city, which, no doubt, you all know; a place where almost all the laws of nature that exist in this northern section of the country are disregarded. It is not unfrequently that you find the Mississippi swelled beyond the level of the city.

Its banks are saturated with water at almost all seasons of the year, so that it is quite well known that digging is impossible. Cellars, vaults, and other places receive deposits that do not exist in the northern cities, consequently the wharves in certain districts become saturated with water. Every combination of circumstances exists there to generate the disease with a certain degree of virulence. Vessels that traded between New Orleans and the West India Islands as far back as 1823, brought Yellow Fever patients into the port of New Orleans. I would speak, however, more in explanation of the vote I shall give on this subject. I cannot be reconciled to the Report, in the language that is presented when it affirms that no good, no benefit, has heretofore resulted, or will hereafter result, from Quarantine regulations. Vessels that are known to be contaminated, when quarantined, of course prevent the disease from being brought to the wharves of this and other cities. The inmates of these ships, the passengers and the crew, according to my judgment, have for a long series of years been subjected to barbarous treatment. Of necessity or choice they become hands or passengers on board of these various ships, and in the progress of the passage may be seized with disease. That they should be condemned to a hospital, I have always regarded as improper; for with proper ablutions, cleanliness, change of garment, and leaving behind all that species of material which would be likely to generate the disease, they could be safely allowed to proceed to the city, instead of being confined within the walls of a lazaretto. In giving my vote, I shall be guided by the principle that Quarantines have produced good, from the foundation of the law authorizing them in this and other countries; and I believe they must do good. I should be sorry that the medical talent of this country should send forth to the world that they had but little faith in their existence. I cannot, so long as I have the evidence

of my observation and the exercise of my reason, vote to exclude the system. I hope that at some future day—for it appears to me that we are not sufficiently harmonized in all our views—there will emanate from this body, or its successors, something that will come in the form of a petition to Congress, or to the legislative bodies of the different States, that may be regarded as coming with authority, that will lay the foundation of a better system than we have at present.

Dr. BALDWIN :

I move to strike out the entire paragraph on the 55th page of the Report on Quarantine, commencing at the eleventh line :

“Every system of Quarantine which fails in the accomplishment of the only legitimate object of its institution, can be viewed in no other light than as a grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea that it is necessary as a prudent preventive measure. From an inefficient or a badly and imperfectly administered Quarantine, no possible good can result. It is simply an arbitrary curtailment of the freedom of intercourse and of trade, without any equivalent good to justify its infliction.”

I also move to strike out the paragraph found at the bottom of the same page, as follows .

“To the question that has been submitted for investigation, it is somewhat difficult to furnish any categorical answer. By the terms of the question it would seem to be implied that there is now in operation a system of Quarantine, so far correct in principles and practice, as to require only certain reforms in respect to some of its features, in order to render it sufficiently simple and efficient on the one hand, and on the other, as little burdensome and restrictive as it is possible for Quarantine regulations to be rendered. Now, the Committee can-

didly confesses that it knows of no existing system of Quarantine that can be esteemed correct in theory, or calculated to secure any beneficial result in practice."

Dr. MILLER, Health Commissioner of New York :

We are now proposing to amend a report from a Committee, and if that is legitimate, I have no suggestions to make. It is usual in bodies that I have met with, where documents of this kind have been brought before them, to have certain resolutions appended to the Report, as expressive not only of the sentiments of that Committee, but also to be either rejected, amended, or adopted by the body before which they come. This Report contains the sentiments of that Committee, and they have a right to express their views, and I question very much whether this body has a right to take their sentiments, and then say that their sentiments shall be thus and so ; but I suppose that this body has a perfect right to adopt a series of resolutions expressive of their sentiments in regard to the subject of Quarantine. We have already accepted the Report of the Committee, and that I suppose is perfectly correct. I should question the propriety of amending the Report of the Committee, but I suppose that it would be perfectly proper for us at this time to postpone the subject, or else refer the matter to a Committee to draft resolutions expressive of the sentiments of this body, and then the subject can be discussed in a condensed form.

The PRESIDENT (having resumed the chair):

The Convention is at liberty to strike out a part of the Report, or to alter and amend it, as an expression of its own opinion. In reference to referring this matter to a Committee, it is but proper that the gentleman should be informed that the question has already been decided in the negative.

Dr. KEMP:

The language of this Report is stronger than it struck the members of the Committee as being, when the proof was read, and it is stronger than I am willing by any means to sanction, although I am a member of that Committee. It was at a very late date that the proof of the Report was sent to me in Baltimore. I hold that when the transaction of any business has been intrusted to a set of men, that it is their duty to use such language as will express their sentiments correctly. This Report, I acknowledge, does not; and I want to say to the Convention, as a member of the Committee, how this language happens to be here. We were waiting for Dr. *Wragg's* communication, and also for the communication of Dr. *Cleveland*, of Brooklyn. The proof of this was sent to me at a very late day indeed, and I was obliged to read it in my carriage, as I drove along the street. I could not read it with the care that I would have done, if I had had sufficient leisure to sit down and peruse it carefully. These strong expressions escaped my attention, and I do not sanction them, and I have no objection to the Convention striking them out. It would be well for the Convention to adopt the Report, after striking out these lines, found on the 55th page of the Report: "From an inefficient or a badly and imperfectly administered Quarantine no possible good can result. It is simply an arbitrary curtailment of the freedom of intercourse and of trade, without any equivalent good to justify its infliction."

The subject is not carefully stated, and I think these words should be stricken out. Then, in order to make sense of the lower paragraph on the 55th page, strike out the first sentence, which reads thus: "To the question that has been submitted for investigation, it is somewhat difficult to furnish any categorical answer."

Mr. CHARLES H. HASWELL, of New York: I would remind

the gentleman from Baltimore (Dr. Kemp), that it is altogether unparliamentary to amend a report.

Dr. BALDWIN: The President has decided that we could adopt this Report as a whole, or reject a portion of it. The gentleman, who was one of the signers of this Report, has admitted that certain portions of it are in too strong language. I think so too. I think it was drawn up by an individual who was opposed to all Quarantine regulations. The entire tone of the Report is of that character. I do not know that the gentleman is present; but if he is, I would like him to explain the hard words in it. I hope that the amendments suggested by Dr. Kemp will be adopted.

Dr. GUTHRIE: I confess I am very much afraid, that if there are one or two imperfect or wrong statements in the Report, there may be others which have not been discovered. I would therefore move that the vote by which this Report was adopted be reconsidered. I shall then move that it be accepted.

Dr. JAMES R. WOOD, of New York:

It strikes me that the resolution offered by the gentleman does not meet the question. That Report is either wrong, or it is right. My opinion is, that it is wrong; it does not state the truth. The literature of this subject will not prove the positions taken by that Committee; and I am glad to hear a gentleman connected with that Committee, disavow the accuracy of the Report. If there are certain portions of the Report objectionable, as some of us believe to be the case, perhaps upon a careful perusal of it, other portions of it would be seen to be equally objectionable. I move that the Report be referred back to the Committee, with instructions to report it complete at the next session of this body.

Dr. MILLER moved to amend by adding "that that Com-

mittee be requested to append resolutions expressive of their sentiments upon the subject."

Dr. WOOD accepted the amendment.

The resolution as amended, was then put and adopted.

The following invitations were received by the Convention, and accepted:

From the Common Council of the City of New York, to attend a complimentary banquet at the Metropolitan Hotel, on Friday evening.

From Mrs. Du Bois, to visit the Child's Hospital.

From the Governors of the Alms House, to visit the public institutions of the City.

On motion the Convention then adjourned, to meet at 7½ P.M.

SECOND DAY—THURSDAY, APRIL 28TH.

EVENING SESSION.

THE Convention met at 7.30 P.M., pursuant to adjournment.

The President having called the Convention to order, the Secretary read the minutes of the morning session, which were approved.

The PRESIDENT announced the reception of the following communication :

Gentlemen of the Sanitary Convention :

Will you be so good as to appoint a Committee to investigate my plan of compressing and refrigerating the atmosphere, preliminary to its use for disinfecting vessels and inclosed premises which are contaminated with the malaria of Yellow Fever ?

And oblige yours, very respectfully,

13 Bond Street.

W. A. ROYCE.

The President appointed a Committee to investigate the matter.

A communication was also received from CHARLES METTAM, submitting plans of new family dwellings, about to be erected in this city.

A Committee was appointed to examine the plans.

The PRESIDENT :

The special order is the Report of the Committee on the internal hygiene of cities. The Committee was appointed at

Baltimore, last year, and its Report has been placed in the hands of the members of the Convention. The discussion of that subject is now in order.

Dr. SNOW :

I believe the Business Committee made some recommendations with regard to that Report ; I propose that we take the Report of the Business Committee.

The PRESIDENT :

That refers to the Sanitary Code. The Business Committee have recommended, and I believe the Convention this morning adopted, the suggestion of discussing the Sanitary Code, which is attached to the latter end of the Report.

Dr. CLARK, of Boston :

I would simply remark that the various subjects referred to the Committee were assigned to different members of it. With regard to this Code, those gentlemen who have been familiar with sanitary matters may, no doubt, recognize some things adopted by the Board of Health, in the English Code. Such a document as this cannot be original, and I felt at liberty to take materials wherever I could find them. The idea of the Committee was to report a draft or form of a Code, as a basis for the consideration of this Convention, and, if adopted in substance, to be recommended afterwards in a revised form to the various States for their adoption, to be altered and suited to their own circumstances.

The plan is, in the first place, that the Health Act should be recommended to be passed by the respective Legislatures, where some equivalent act does not already exist, for the purpose of giving power to the Local Boards of Health, and as a foundation for their acts. In Maryland and Massachusetts there are already sufficient laws upon the subject.

Dr. BELL, one of the Secretaries, then read the Public

Health Act, which will be found in the Report on the Internal Hygiene of Cities.

The PRESIDENT :

The part which has been read comprises that which refers to the State authorities, I believe, exclusively. Does it not, Dr. Clark ?

Dr. CLARK :

Yes, sir ; the part which has been read is recommended as a form for some State law : that is to say, in order to pass local sanitary laws, it is necessary to have some basis or foundation, and this or some similar form will be necessary before the city authorities can pass their own acts. I hope gentlemen will suggest any alterations or improvements they may see fit. I have no feeling or wish, as it respects a particular form, except to have the matter in the most perfect shape.

Dr. JEFFRIES, of Boston :

The second article says, "The Governor of the Commonwealth," &c., and afterwards, in all the other articles, it says, "The inhabitants of the State." I would suggest the propriety of saying, "The Governor of the Commonwealth or State."

Dr. STEVENS :

That would not be applicable to New York.

Dr. CLARK :

I merely put in "the Commonwealth," because that was the form in Massachusetts. Those places might be left blank, but by putting in something, it is suggestive of what is intended.

Dr. GRANT :

In order that this may be brought before the Convention, I move that this draft be adopted.

PROSPER M. WETMORE :

I am free to admit, sir, that there is great merit in the draft of the law which has been read from the report of Dr. Clark ; but it is impossible that any single draft of a law upon this subject would be effectual alike in all cities. I rise, sir, to discuss for a moment, the general proposition before the Convention, provided the Chair shall rule me to be in order upon this motion.

When the distinguished gentleman who welcomed the Convention to this Hall, said that we met here at a favorable juncture in the public affairs, that it was a propitious period which brought us together, I was forcibly struck with the remark in one particular view of the subject—that was especially in reference to the city in which we meet, to the city which is my home.

No city, no community, was ever more in need of a thorough, effective sanitary reform, for the preservation of health and prolongation of life, than is the city of New York, at the present moment.

Dr. NICHOLS, Vice-President, presiding: The second section of the Code refers more particularly to State governments, whilst the next relates to cities. The gentleman's remarks would therefore come more properly under the next head.

Dr. GRISCOM: In its totality the draft which has been presented strikes me as exceedingly proper, and with perhaps one single exception in which it may fail, well adapted to its purpose. The idea presented in it is this, as I understand it, that the State shall appoint through its proper executive officer, with

the consent of his advisors, a certain Board, to be called "the General Board of Health," which shall supervise the sanitary affairs of the entire State. That Board is intended to have an oversight and supervision of all that relates to the sanitary interests of the people of the State. I presume it would not be necessary to occupy a moment to explain to this Convention what is meant by the sanitary interests of the people of the State. What profundity of knowledge, if I may use the expression, is requisite to penetrate into all the depths of the influences which control the lives and the health of the people! We have discussed for four hours this morning the question of disease. We have, I might say, come to the same conclusion that the medical profession, and those who are learned in sanitary affairs, have arrived at long since, that there is great doubt, uncertainty, and difficulty in ascertaining all the influences which bear upon the health of the people. They are ramified throughout all nature; they descend upon us from above; they reach us from below; they surround us on all sides. Influences for health and disease are found in the water we drink, in the food we eat, in the fruits that grow upon the trees, in the vegetables from the earth, and in the atmosphere which we inhale. Now, it is not necessary for us to go further to show that here is opened at once a wide field for scientific research. The whole of chemistry is embraced in this subject, as well as natural philosophy, meteorology, and physiology, animal and vegetable; yet I find no reference in this draft of a law, no allusion whatever to the qualifications necessary for membership of a Board of Health; there is nothing in it directed towards those matters to which I have referred. The Governor, to be sure, with the consent of his counsel, shall appoint "five discreet and suitable persons," whom, in his judgment, he shall deem discreet and suitable. There is no requisition upon him to appoint a scientific man; there is no requisi-

tion that he shall appoint a chemist, a natural philosopher, a meteorologist, or a person competent in any particular branch of science, which is comprised in the catalogue to which I have alluded. We have had sufficient experience in this city, and in this State, that professional qualifications are very apt, under those circumstances, to be entirely overlooked, and, with pain I have to say it, scoffed at, scorned, and derided. There are those here who can bear me out in this assertion, that we have suffered in the city and State of New York from ignominious feelings in those who have had these matters in charge. The State of New York has laws upon the statute-book requiring certain officers to possess certain qualifications, so far as the law can define those qualifications. So far as those laws are concerned, the people have been protected in that matter. The State law requires certain officers to possess certain qualifications, and the Governor of the State, or the Mayor of the City, can go no further in carrying out the law than merely to appoint the men who in his judgment, he supposes to be qualified under the law. Heretofore, however, the appointments which have been made under the laws to which I have referred, have been sound and discreet, so far as we are aware. The Governor of the State, and the Mayor of the City, are bound by such a law in some instances. In the year 1832, when the Cholera first prevailed here, the Legislature of the State of New York enacted a law authorizing every town and village to appoint a Board of Health, which should have supreme control over its sanitary affairs, which Board of Health was limited in duration; it expired by its own limitation, when the apprehension of Cholera disappeared. This law required of the Board of Health the appointment of a "competent practitioner of medicine" as its executive officer; but here, in the general law now before us, there is referred to the Board of Health the supervision of

all the sanitary affairs of the State, but no requisition is made that the Board shall be comprised in part or in whole of medical or scientific men. I consider that a great omission. It is impossible to trust to the discretion of politicians to give us, for sanitary purposes, discreet men, unless the discretion shall be defined by law. For myself, I should consider the matter a great deal more safe, that the health and lives of the people would be a great deal more secure, if a certain part (not the whole) should be required by law to be composed of medical men; and if it were possible to define by law the qualifications of the medical men, I should prefer that to be done. I do not deem that the words "discreet and suitable" cover the case; the qualifications, so far as capacity goes, must be more definitely prescribed. Whether it would be proper to require that amongst the *ex officio* members of this Board, there should be one taken from some institution which the State recognizes, or whether the appointments should be made upon some other basis, or from other sources, I do not pretend to determine. It would be a difficult matter to determine for all the States. As this law is intended to apply to all the States of the Union, it would be impossible to define, in that way, who should be appointed; but that something of that kind, requiring one or two or a certain portion of the Board of Health, to be composed of persons who are familiar with all the relations of sanitary law and science, and all the means by which disease is to be postponed and avoided, I am perfectly satisfied is necessary for the preservation of the health of the people.

Dr. NICHOLS, President *pro tem.* :

Will Dr. GRISCOM make any motion to amend the Report?

Dr. GRISCOM: I should, of course, be able to reduce my views to practice. The Government of the United States

perfectly understands this matter in its army and navy regulations. Every thing connected with the medical service of the army and navy, is committed solely to the custody of medical men; and I can see no objection whatever to the incorporation of the same idea in a code which regulates the sanitary affairs of the civic part of the population. I would suggest, that after the words "five discreet and suitable persons," there shall be inserted these words, "two of whom shall be physicians," or any other language that may more directly express the idea. There are seven in the Board; I think at least two of them should be men thoroughly conversant with medical science. I move to amend by inserting after the word persons, "at least two of whom shall be physicians." If any body can suggest a more suitable term than that, I shall be very glad to hear it.

Dr. BUDDINGTON, of Philadelphia: I would suggest the word "four" instead of "two."

Dr. McNULTY: With all due deference to the decision of the Chair, I think that General WETMORE was on the right track in this matter. I think it is an impossibility to frame a law which shall, with slight modifications, adapt itself to the various laws of the several States; and I think that General WETMORE could have given you valuable experience in reference to passing a sanitary law. I know, sir, from some personal experience in this matter, as well as the gentleman who last spoke (Dr. Griscom), that it is a very difficult thing to draw up a law which will be applicable to all the States. I move that this matter of drafting a law be laid upon the table.

Dr. CLARK, of Boston:

I have no objection, personally, to the suggestion of my friend, Dr. GRISCOM. I think it would be very well to interpolate into this draft a provision that two or three of the

Board shall consist of medical men. Although I specified "five discreet and suitable persons," I did not mean to exclude medical men, but deemed it best to leave it open for the Convention; I think the number three will be better.

Dr. GRISCOM: I accept the amendment for three.

The SECRETARY: The section will read, "The Governor, &c., shall appoint five suitable persons, three of whom shall be physicians," &c.

Dr. JEFFRIES: I would suggest that the term should be "Doctors of Medicine," as the term physician is often assumed.

Dr. GRISCOM: I will accept the amendment, as better defining the object.

The SECRETARY: The section will read, "Three of whom shall be Doctors of Medicine."

Alderman BRADLEY, of New York: I move that the word "Council" be stricken out, and the words "appointing power of the State" be inserted.

Dr. CLARK, of Boston: The object of this draft is simply a *hint*, to conform to the circumstances of any State. It would be impossible to insert in any one draft the forms and terms which are applicable to all the States of the Union, although in its main purposes it might answer.

Dr. STEVENS: I would suggest that the line be left blank.

Dr. CLARK: If it is left blank, it will be necessary to make a note, so that it may be known what to put into the blank.

Dr. KEMP, of Baltimore: It is not possible for you to arrive at any conclusion in this way, where you are drawing up a draft to be adopted by a Legislature. If you went into

my State, you would have to word it differently from what it is here.

It is not possible for you to word your enacting clause, referring to the appointing power definitely, unless you take the thirty-three States of the Union, and draft the code in accordance with their peculiar laws. I was going to make a remark a moment ago on this very point. There is another thing I wish to make a few remarks upon, growing out of local questions, but I will not now consume the time. If every body is wanting an enacting clause in accordance with the form of the law in his own State, we will never get through with this discussion. In the State of Maryland, the law must commence, "Be it enacted by the Senate and House of Delegates." You have got some other wording in New York; you cannot say: "The appointing power." It strikes me, just at this point of the discussion on this matter, that we had better drop a law form, stating propositions that ought to be matter of law. It strikes me that that would be the better plan. I make this suggestion for the consideration of the Convention. Suppose that we say here, instead of this second clause, "There shall be appointed in every State a committee (call it what you please) of five discreet men, three of whom shall be physicians, who with the Governor and Secretary of the State," &c. Let it be a suggestion to the State Governments, and let each State word it according to its own laws, for they all differ in shape and manner. If the Convention can modify the language in any way, it would be well to do so.

Dr. McNULTY: We should get up certain distinct propositions. The Legislatures will pay no attention to a form of an ordinance, in my judgment. We are merely wasting our time in discussing this form.

The question was then taken on Dr. Griscom's amendment, and it was carried.

PRESIDENT *pro tem.* : It is moved and seconded that the ten sections of the draft that have been read, be adopted by the Convention.

Mayor RODMAN : It strikes me that if the ten sections will not bear the strength of discussion, we had better lay the whole thing aside entirely. I might be inclined to vote for every one, but I have been led to suppose that we should take them up one by one as we went along, and give them a fair and candid discussion ; but if we are to take them as a whole, I should feel it my duty to adopt them.

The motion was then put, and the Code was adopted.

Dr. KEMP : If the Convention in the city of New York is disposed to put ten paragraphs through in this way, I, for one, am perfectly content ; but it is a kind of legislation to which, however, I am unaccustomed. The Code embraces ten propositions, no two of which are alike, covering the whole subject of State legislation, affecting the sanitary operations in your cities, and tying the hands of your municipal authorities.

PRESIDENT *pro tem.* : There is no question before the house.

Mayor RODMAN : I think the vote was not taken.

F. E. MATHER : I made that motion to adopt the Code, supposing that the Convention was ready for the question. If I thought they were not ready to vote upon it, I should not have made the motion.

A motion to reconsider the vote was put and adopted.

Mr. MATHER : In regard to this subject, although it is but a repetition of what has been said by others, I regard this proposed Code as but the expression of certain principles or propositions. It has been well said, that if we, individually or collectively, will undertake in any wise to adapt it to the

different States, it will be a work in vain. If there is any thing in the detail of these ten sections which have been read as propositions that does not accord with the sentiments of any gentleman present, I hope he will present his objections at once.

Dr. GRISCOM: What is the motion before the house?

PRESIDENT *pro tem.*: The adoption of the Code.

Mr. MATHER: I renew my motion to have the ten sections adopted.

Dr. MILLER: I second the motion, and I do so because I suppose that there is nothing official in the adoption of this Code, otherwise than as coming from this body as a recommendation to the legislative bodies of the different States. If members of this body shall see fit to make recommendations to the Legislatures in their several States, they could adopt something in the shape here blocked out for their government. In this State we now have acts relating to the matter. The idea has been generally prevalent in this State, mostly, that cities and villages, as far as practicable, should do their own legislation in regard to the health of their several localities, and not depend upon any one power, located either at our seat of legislation at Albany, or elsewhere, but that each locality should be responsible for its own health and for its own action. Unless I greatly mistake, that has been the intent in this State. I suppose no harm can arise from putting these ten sections before the Legislature just as they are. I have never known a Legislature in which there have not been more or less medical men, and usually some very able men. I believe that our State Legislature this winter will show us that some of our ablest legislators were medical men, and were competent to look at things of this kind, if put before them in a proper manner.

Dr. GRISCOM: I submit that this discussion is out of order, the amendment having been adopted. The character of the Legislature is not a matter before us, but the Board of Health.

Dr. HARRIS, of New York: I second the motion, for the purpose of saving time and bringing the matter to a point.

Dr. STEVENS: Mr. President, allow me say one word. It does appear to me that we are not likely to accomplish our objects by putting forth such a code as the one we are now considering. The most prominent idea, in my view, that we should put before the public, is this fact: that no one, nor two or three medical men, could be well selected to understand the best mode of carrying out effective sanitary measures. I speak this advisedly. It has been the subject of my reading and reflection for many years, I profess to know very little about the subject; it has enlarged far beyond my reading and research. To conduct well-advised and proper sanitary regulations requires the talents not only of a medical man, but also of an accurate chemist—a chemist whose researches have been directed to a particular line of study, connected with the vitiations of air and of organic chemistry; and besides, to understand the most advantageous mode of drainage, requires a knowledge of geology; and for the construction of drains, a knowledge of engineering is absolutely necessary.

PRESIDENT *pro tem.*: In the after-sections of this draft, these things are all taken up and discussed in detail.

Dr. STEVENS: But the men required to arrange the work are not named; nor is there any provision made for sanitary libraries. The necessary books to afford a thorough knowledge of sanitary matters are too dear for any one individual to purchase.

Dr. GRISCOM: Judging from the remarks of Dr. Stevens,

he misapprehends the nature of the act we have in hand. It is a State law establishing a General Board of Health, not the local executive officers of the towns and cities. These are all provided for in subsequent sections of the act, under the ordinance. I desire to call the attention of the Convention to another matter which has struck me very forcibly since the reconsideration of the matter.

The eighth section reads thus :

“The corporate authorities of the various cities and towns of this Commonwealth are hereby authorized and empowered to establish Local Boards of Health, and to enact and enforce, generally and severally, such laws, ordinances, and regulations as they may deem expedient or necessary for promoting the sanitary condition of the said cities and towns, as are not inconsistent with the constitution and laws of the State, or the authority of the General Board of Health.”

Now, sir, I regard this section as it stands as a great mistake, and I found my judgment and conclusions upon an example which just such a law as that has given to a certain local Board of Health, in the State of New York, during the past year. But for such a law as that, but for such a plenary power as is there given to the town of Castleton, in the county of Richmond, the country and humanity would have been saved the awful disgrace which that small body of men have inflicted upon us, by the destruction of the hospitals by fire. There was a mob raised under just such a law as this. The owners of property had no appeal to any higher Board of Health. That Local Board of Health consisted of four or five persons. Admitting that the Hospital for the cure of the sick was a nuisance—although it was never proved in a single instance to be a nuisance—that did not authorize the mob to apply the torch and burn down the buildings, with I do not know how many hundred patients—though first removing them.

There is an example of unlimited power to an irresponsible Local Board, amongst whom, I believe, there was not a single physician who could judge of the value of the act, or the fact of the Hospital being a nuisance or not, except the Health Officer, who was an executive officer, and appointed by them. I consider, therefore, that this section requires some very serious amendment; what it shall be, I am not this moment prepared to say, as the matter has just come to my attention, but there must be some appeal from these Local Boards to a higher authority, so that private property, under these circumstances—or, as in the case to which I have alluded, public property—may not be at the mercy of an ignorant, willful, or selfish mob of people. I ask permission to have this section referred back to the Committee for amendment in that particular.

The motion was seconded.

Dr. H. G. CLARK, of Boston: I will suggest if it will not save time by commencing at the first section and going right through, and let gentlemen suggest amendments as we proceed. I move that we take up the Code section by section.

Dr. STEVENS: In speaking of the act of burning down the hospital, in my opinion it is quite redeemed in a scientific point of view, by showing that the patients were much better out of the hospitals, in the PURE AIR, than they were before.

Mr. WETMORE: To save time, I will request the Secretary to read the 8th section, with a view to show that the few remarks which I intended to offer were in order.

The Secretary read the 8th section of the Code.

Mayor RODMAN: Even if we take this Code up, and pass it, section by section, and send it to the various Legislatures of the several States, it would then be laid aside, analyzed,

and a general bill would perhaps be framed upon it. It strikes me that the intention of the Convention would be more readily met and be more practical in its operations, if a communication should be made from this Convention, laying this whole formula aside. Let a communication be made from this Convention, in an epistolary form, to the various Governors of the several States, requesting them to present the subjects embodied in this Code to their respective Legislatures. The sensitiveness of Legislatures, in reference to Conventions of this kind, is proverbial. By adopting this suggestion, prejudice would be overcome, and the object which this Convention has in view would be accomplished through this means.

The first, second, third, and fourth sections of the Code were then read by the Secretary, and on motion were adopted.

Dr. GRISCOM: In reference to the fifth section, which reads, "They shall appoint a competent person, who may also be the Register General, to be the Secretary or Actuary of the Board, who shall receive such a salary, not exceeding — dollars per annum, as the Board shall determine. They shall also appoint, if need be, a competent physician, who shall be styled a Medical Health Officer, and another competent person for Surveyor, who shall be removable at their pleasure, and who shall receive such fees, or other compensation, as the Board may from time to time determine. They may also appoint and employ such other persons as may be necessary to carry into effect the sanitary laws of the State, and delegate to them the necessary powers, subject to the approval of the Local Boards of Health, hereinafter provided for."

I do not precisely apprehend why it is that this Board should require, besides a Register General, a Secretary or Actuary, a Physician, and a Surveyor, for State purposes. I

should like very much to have those who drafted this law explain what they mean.

Dr. STEVENS: Is not this child's play? Is not this making a Procrustean bed for every one to sleep upon? Would it not be best to put forth the general idea of what we deem proper? Every different community will require a different law. What we want is a statement of the objects to be attained, coming forth under the sanction of this Convention, and not a form of this kind dictated to the Legislature, who will not suffer themselves to be dictated to. I entirely agree with the observations made by Mayor RODMAN, and would feel happy if the Convention would take counsel on the good suggestions made by him. There are those here who can put the matter in a legal shape.

Dr. CLARK, of Boston: I wish to say one word, if the Convention will pardon me. The gentlemen seem to misapprehend the whole idea of this thing, and we are going on in the dark in that respect. If Dr. Stevens will refer to the report of the proceedings of the Convention in Baltimore, he will see that the Sanitary Committee was instructed to report some specific plan or code, relating to the hygiene of cities, and report the same to this Convention. This Committee has performed its duty to the best of its ability. This Code has been reported to this Convention, with the intention, if the Convention should adopt it, to have each delegation take a copy of it, and if they saw fit, recommend it to their own Board of Health, as the basis for the procurement of a bill upon which they might found future action. Nothing is enforced. There is no law to be passed by this Convention; it is simply the draft of a form, which may answer as a basis for them to act upon, if they choose to do so. With regard to the particular point which Dr. Griscom inquired about, the Committee thought best to pro-

vide for all contingencies, and supposed that the Board of Health might require the opinion of a medical man. The Committee thought they would provide for it in that way; that the rest of the Board might be commercial or business men, but that they might be advised, when they chose, by a competent medical man; also, that they might have plans furnished them by a competent engineer or surveyor; they would be the agents or couriers of the Board

The fifth section was then adopted.

The Secretary read the sixth section, as follows:

"They shall consider and decide upon sanitary questions submitted to them by the State, cities, towns, or Local Boards of Health."

Dr. KEMP: There is a point on which it is well for this Convention to stop and consider. Let us take the State of New York for example. You have not said from what section of the State these five gentlemen who are to compose the Board of Health are to be taken. Now, sir, if an emergency springs up in the State of New York, is your Municipal Board of Health to hunt them up, get them together, and submit to them their views in reference to the measures to be enforced here at once? That is a point that I felt aggrieved at when the ten propositions were passed *en masse*. This may be the way in which legislation is done at the North, but in my State we are not accustomed to have the State interfere with municipal health regulations in any manner.

Dr. CLARK: The gentleman misapprehends the whole thing.

The sixth section was then adopted.

The seventh was read, as follows:

"They shall by reports, or otherwise, diffuse information

to the inhabitants of the State on sanitary matters ; and shall aid, by regulations, suggestions, and by furnishing blanks, &c., the various Local Boards of Health."

This section was also adopted.

The Secretary then read the 8th section.

MR. WETMORE: Will it be in order to discuss the general question relating to the sanitary government of cities, under this order of business ?

PRESIDENT *pro tem.* : Yes, sir, that will be in order.

MR. WETMORE: Mr. President, the more I look at this draft of a general system of regulations, the more I feel obliged to the gentlemen by whom it was prepared, for the labor and zeal that they have bestowed upon the subject confided to them. But, sir, I feel equally the more satisfied, the more I read the paper, that it would be utterly impossible for us to make it available, in its present form, for the purposes of this Convention. It has been my fortune, sir, within the last six months, to have been assiduously engaged in council with a number of the ablest among our scientific men, in an effort to prepare a proper sanitary law. Several months were occupied in maturing such a code as was deemed necessary for the government of a city upon sanitary principles. Sir, among those who came into council upon that important subject, were men who had been engaged for years, not only in investigations which qualified them to give advice, but in similar efforts to prepare a proper code. The final result of our labors is as different from this as the Bible is from the Koran, and yet both have the same object in view, and both are meant for the common good. I think, therefore, that we are misusing our time in discussing a general code which, after all, the more we look at it, the more we shall find does not answer the general object that we have in view. It will suit, perhaps, Maryland, or it may suit

Massachusetts ; probably it would suit Massachusetts. She is governed, not perhaps by a more rigid system of laws, but those laws have the control over a people that submit more quietly and deferentially to the laws under which they live. Some communities, some commonwealths, require stronger power in the arm of the law than others. I speak in the midst of a community that must be governed by more stringent enactments than are necessary to control the metropolis of Massachusetts. Therefore, in my judgment, we cannot safely legislate for the whole country upon a subject of this kind ; and there is great force in the words which fell from the distinguished gentleman from Maryland, when he spoke on this subject. But, sir, there is enough in this document to give us an opportunity for discussion upon a great principle ; and if the Chair will kindly consider me in order, I have a few words to say upon that subject which relates to the sanitary government of a city.

Sir, there was great truth in the few words that were delivered from the Chair, when our distinguished presiding officer assumed that honorable position yesterday. He pointed out very graphically and clearly to us (thoroughly understanding the subject as he does) the vast difference that exists between the two branches of sanitary science which we are met here to consider ; one relating to the Quarantine, and the other to the internal hygiene of cities. What I shall have to say will be principally upon the second branch of the subject, and I must ask the Convention to bear with me in the imperfect manner in which I shall discuss it, for I did not know, when I came into the room, what would be the subject under consideration to-night.

In all the combinations that are made for the protection of a beleaguered city, the outward defenses are as nothing in

comparison with what pertains to the citadel. The earthen embankments may be beaten down, the intrenchments filled up, the granite fortresses may be razed to the earth, but so long as the citadel remains impregnable, the community is safe. I regard that rule as holding good in sanitary science as well as in war. Your Quarantines are your outward embankments, and they ought to be protected. I delight to know that science is engaged in maintaining them upon a proper basis. It gives me pleasure whenever I see the evidence that scientific men, and the people at large, are united in harmonious efforts to secure protection against the inroads of pestilential disease, by a properly organized, properly managed, and properly supported Quarantine, in which the safeguards of health may be secured without the imposition of unnecessary restrictions upon commerce, or upon the freedom of the citizen.

But, sir, give me a thoroughly organized sanitary police in the city, which is to guard the health, minister to the comfort, and give length of days to the people. (Applause.) You cannot do this without such a police. Every word that I utter here, though it may be held to be directed mainly to the interests of the city in which I live, and in which I have spent my life, is equally true in reference to every city upon this continent. We are all but one band of brotherhood in these matters. I rejoice to know that the cities of Mobile, Charleston, Philadelphia, Baltimore, Providence, and Boston are all under good sanitary regulations, and that the people are prosperous, healthy, and happy, and I wish I could hear the same glad tidings in reference to the city of New York. (Applause.)

We come here for the common good, and we must discuss these principles for the general benefit, and not for individual communities. Sir, if I could feel myself at liberty to state, in words that would go forth to the public, the facts to show how

greatly we need the influence of such a body as this before which I speak, to aid us in reforming our local government in reference to its sanitary management, I should startle this Convention by the revelations I should make; but I do not think it expedient to say all that I know on this subject. But this much I will say, that a city endowed by the hand of nature with a position where health should be its great characteristic, has from mismanagement become a most unhealthy city. The mortality statistics show that the people are not properly protected by sanitary regulations. We are annually losing our thousands upon thousands here by preventable diseases, when those lives might be spared if we had a proper sanitary government. If the science of hygiene in cities was understood and properly administered among us as it is in other places, well might we be proud, as we all now profess to be, of our city, of its greatness, of its marvelous rise to wealth and power and importance. But, sir, we ought to bow our heads in shame when we contrast the actual condition of a city thus eligibly situated, with the condition of other cities far less favored by nature. I am reminded of the beneficial results arising from a well-governed city in respect to its sanitary arrangements, by the presence of a gentleman representing a city eastward of us (Dr. Stone, of Providence, R. I.), to whom I look as I would to some extraordinary specimen of humanity, for what he has accomplished in the sanitary regulation of the city which he honors by his presence here as her representative. Let us take note of what he shall say on this interesting subject. When he comes to talk to us of the management of cities, let us sit quietly and listen, and profit by what he tells us. Let me say a word also of Boston, another city well governed in regard to its sanitary regulations. In New York, in the first six months of the year 1858, we lost by Small Pox 425 lives, while in Boston in the whole of that year, not a human being died of that loathsome

disease. Does not that tell a tale of good sanitary municipal management? Does not that fact show the importance of internal hygiene in cities? Sir, within the city of New York, as appears by the statistical tables, which I take from the records of the City Inspector, who is the individual charged with the custody of these figures, one person died in 1857 in every 27 of the inhabitants; while in Providence, in the same year, but one died in every 55, and in the city of Boston, one in every 42. In London, a great metropolis, located in so unfavorable a position that you might reasonably expect to find pestilence and death rife among the people, only one inhabitant dies in every 45. *One death in 45 in London*, a city with a river polluted by noisome filth passing before the doors of its citizens, poisoning the atmosphere with its effluvia; and yet in New York, with this noble estuary in our front inviting to our doors the fresh breezes from the ocean, broad rivers upon either hand, with a stream of as pure water as ever gushed from the bosom of the earth flowing beneath every street and every avenue, one inhabitant dies in every 27 annually! Here is a contrast which shows with appalling force the difference between a well-governed and an *unfortunately* governed city, to use the mildest phrase I can employ. (Applause.) Sir, we are behind the lights of the age.

And that brings me to the one point I want to make before this Convention, which is *the importance of enlisting medical science in the management of the health of every city*. Science is making its mark upon the age. In whatever direction our attention can be turned in regard to business, to internal and external communication, to every thing, in short, that marks the progress of an age in the development of ingenuity, and the power of the human intellect, what is there in which science has not made itself felt throughout the world, save only, so far as I know, in not making its mark upon the minds and conduct of those whose business it is to

protect the health of the city of New York? (Applause.) Sir, there ought not to be in existence in any city a Board of Health which has not in its organization the controlling elements of medical science. That is the ground I take. (Applause.) I believe in good common-sense for the ordinary business of life. I know little of science myself. I rarely venture to discuss scientific subjects. I only speak plain thoughts which fill my mind, and simply endeavor to say right on in plain words what I think and know. And I do know that it is the height of folly to attempt to govern a city, in regard to its sanitary regulations, without placing the control under medical guidance, care, influence, and responsibility. (Applause. Who is responsible in a city for its health? Is it your Health Warden, who is perchance a respectable man of business, but never a medical man? Is it the President of your Board of Health (the Mayor), who may be a man of the highest character in his position in life, of an unspotted reputation for integrity, good conduct, and good morals? Can you hold him responsible for death walking triumphantly through your streets unmolested in its march, when he knows nothing of medical science, nothing of the causes of disease or the means of prevention? Certainly not. No man holds him responsible. There is not upon the face of the earth, as I am told by those who are familiar with the facts, so perfect a system of dispensary relief for disease, as we have in the city of New York. We offer to the destitute sick all the appliances by which they may be restored to health, in the shape of medicines and advice, freely given when asked for at the doors of the dispensaries. But where is our official who walks from street to street to seek out the *causes* of disease that exist, to draw them out from obscurity into the light of day, to thread the purlieus of wretchedness, to advise with the patients and see that they be taken to proper places for treatment? Alas! we shall seek in vain for such a minister of mercy.

We have not such an officer in existence, or at least we have not one who pretends to discharge the duty.

Sir, ten years ago, we had the Cholera raging in our midst. After the disease had abated, our municipal government appointed a Committee to inquire into the facts. Their report is pregnant with startling revelations of the existence of the evil of which I speak. That report was signed by the distinguished gentleman who now occupies the gubernatorial chair of the State, who told us in so many words, that during the whole of that dreadful epidemic there was not in New York "a Sanitary Police worthy of the name." Now, I state these broad facts with regard to the city of New York, from a sense of duty, humiliating and grievously painful as it is for me to do so. I cite these facts, in the hope of doing good to ourselves as well as to the inhabitants of other cities. If some good result shall come from it, if you can be induced, in the consideration of this subject, to infuse into the organization of your sanitary regulations for cities the element of medical science, then my words will not have been spoken in vain, for then you will assuredly have saved from the grave, in all your cities, human beings who would otherwise have become the victims of preventable diseases. (Applause.) Sir, it is a melancholy thought, that in a great city like this, such festering sores should afflict the body politic. If any of you, gentlemen of the Convention, are here as strangers, and have the opportunity of visiting some parts of our metropolis, and leisure to mark its improvements in the elements of physical greatness, you will agree with me that there is no improper exultation of language, when I say it is a noble city. It is a noble city in all that makes a community respected, powerful, and influential; but in noticing those parts which most attract your admiration, reflect for a moment that there are other portions of it that will not bear your scrutiny. There are sections of our city in which

human beings are piled up as the stones are laid upon the pyramids—hundreds in a building, thousands in a block—some of those very blocks populous with disease and death. Sir, it is not in accordance with the progress of the age and the lights of science, that these things should exist. They must not be suffered to exist! Every citizen of New York who feels an interest in the welfare of the community in which he lives—who feels proud of the city in which he dwells—ought to lay his hand upon his heart, and say: These evils shall not continue to exist. (Applause.)

We live under a government of laws. It is our duty to obey the laws; but we have the power, by arousing public sentiment, by instructing and influencing the public mind, to *compel* that legislation which has hitherto been denied us. The legislation we require under our organization, must come from the constituted authorities of the State. We have hitherto applied in vain for such a law as would enable us to correct this gigantic wrong. It remains to be seen whether we shall be more successful hereafter; but I do look hopefully to the influence of this body; I look to the influence which its proceedings will exert throughout our community, to produce some speedy relief from the evils under which we are suffering. In a few remarks which fell from a gentleman who sat directly in front of me, he spoke of the influence of medical science in legislation. Sir, I have been a very attentive listener to the discussions of the Legislature in the present year, yet it has not been my fortune to be present at any discussion by medical representatives in that body, in regard to the public health of cities or towns or States. That is the kind of influence we need. If the people will send medical men to the Legislature, with the sole object of advancing the public good, we shall have the advantage of an influence that must prove beneficent in its operation. The whole principle that lies at the root of this matter, is *medical science*. I

began with these words, and I close with them. Give us the benefit of medical science in the sanitary government of our city, and we will speedily throw off this incubus which now presses us down to the earth.

I desire that these printed formulas be referred to a select Committee, for further consideration, as I understand that the original Committee does not exist. It has accomplished its labors and been discharged. But, as the suggestion has come from the gentleman from Maryland, I wish him to move that the whole subject of these formulas be referred to a select Committee, to report such a general form as will best answer all the purposes of the different States represented here in Convention.

Dr. KEMP: The reference of General Wetmore to myself, makes it perhaps necessary that I should detain the Convention with a few remarks, and I hope they will bear with me patiently, because the principle involved in this 8th section, it seems to me, lies at the root of all successful influence that this Convention is going to exert in this matter of legislation. If I should go over the entire ground, if I should consider the question as it is presented in its entirety to my mind, I should occupy the time of the Convention a great deal longer than they would be willing to listen, yet I am sure that even then I should not do justice to the subject. I will take the liberty of referring to only two points, while I most respectfully decline to assent to the proposition to refer this matter to a Committee, for the purpose of drafting resolutions, one reason for which I will mention, and it is this: that the President from courtesy would in all probability put me on that Committee. There is another thing which I will mention here. If you will look very carefully at this draft, you will find that there is more or less conflict in the stipulations of these several sections. Just go back to the 5th section and you will find this language:

"They may also appoint and employ such other persons as may be necessary to carry into effect the Sanitary Laws of the State, and delegate to them the necessary powers, subject to the approval of the local Boards of Health, hereinafter provided for."

"They shall consider and decide upon sanitary questions submitted to them by the State, cities, towns, or Local Boards of Health."

The conclusion of the 8th section declares that Local Boards of Health may enforce and enact "such laws, ordinances, and regulations as they deem expedient or necessary for promoting the sanitary condition of the said cities and towns, as are not inconsistent with the constitution and laws of the State, or the authority of the General Board of Health."

Here is the great point. What has been the experience of communities where the State Legislature has undertaken to enact sanitary laws for the regulation of these matters—a principle to which I am most entirely opposed? The good-working of non-interference on the part of the State is manifest so clearly to us in Baltimore, that there is hardly room for a question upon that subject. In looking at the Quarantine laws, the general laws regulating sanitary matters in cities north of us, Philadelphia, Boston, and perhaps Providence, the State at large undertakes to legislate in very minute special matters in reference to the sanitary condition of cities. The 8th section seems to look at and countenance that very thing; and therein is the cause of the great difficulty that cities experience in managing these matters, whenever there is a conflict arising from any source between the State authorities and any local authorities.

Now, in the charter of the cities of our State, there is a sweeping clause somewhat like this—whether it was because our good fathers in legislation did not observe the extent of the power conferred in that charter, or whether it was because

they designed to commit it to the people whose lives and interests were concerned in that matter, I do not know—that the corporate authorities shall have full power to regulate and control all matters relating to the health and sanitary matters of their city. In any question that may arise in our city, we have no reference at all but to the ordinances of our own Corporation. There is a certain extent, beyond which we cannot go, because of the constitutional limitations in the State; and if our Corporation will raise the money, we are at liberty to do any thing we please to preserve the health and lives of our citizens, that does not violate the vested rights of the people. I hold that that is the condition in which all cities ought to be left. I may be wrong in this conclusion; but we are reaping the fruits of this system in Baltimore, as for the last few years our mortality has only been one in forty-nine. (Applause.) The Board of Health, which consists of three members, has entire control of this matter of the sanitary condition of the city; and therein I conceive is another great advantage, as you are not obliged to consult the peculiarities of twenty, thirty, or forty individuals. To these three men who compose that Board, the citizens look, and they are held accountable for the success of the measures which they institute for the protection and preservation of the lives of the people. We feel that we are held responsible; we derive our living from that community, who regard our action with a watchful eye; our very subsistence and standing as physicians in that community depend upon the care with which we exercise our judgment, in the determination of the questions that pertain to the general health.

Mr. WETMORE: Are they all medical men?

Dr. KEMP: They are. (Applause.) There was a time when our Health Officers, as they were called, were not medical men, but there was associated with them what was termed a Consulting Physician. Our citizens, after looking carefully

at the working of the plan, found oftentimes that when difficulty came up, there was too much Old Town, Up Town, Fell's Point, or Madison avenue, and so they gave the charge of the whole city to three men. (Applause.) So that now, if Fell's Point is neglected, it is not the fault of the Fell's Point man, but of the whole Board of Health. Our ordinances are imperfect in this, and it is a point about which we who now constitute the Board of Health feel a delicacy in making a suggestion. The only post that is necessary to be filled by a physician, is the one that I now occupy. Our Commissioner and Assistant-Commissioner of Health, need not be physicians by ordinance. But our Mayor said that none but physicians should have charge of these matters; knowing and believing that where scientific principles are to be brought into constant operation, the Board of Health should be composed of three physicians. (Applause.) We act in the utmost harmony, and when we have intimations of the outbreak of disease, we know at once that we have nobody else to disturb us in our plans; and the people look confidently to us for the proper precautionary measures. There has been no instance in our city, since we have had charge of these matters, where disease has appeared in our midst, that it has not at once been arrested. (Applause.) The State does not undertake to legislate for us at all. They have given us sweeping privileges in our charter, and the city, acting in accordance therewith, pass their own health laws, that need no supervision from the Governor or any other person. The provisions which I read here from the proposed draft are in direct conflict with our system in Baltimore; and for the reasons I have given I am opposed to this whole proposition.

Let me show the working of our plan. When we have the Yellow Fever, the Board of Health is intrusted with the whole management of the subject. When this disease occurred in Norfolk in 1855, that subject was the first thing in the

administration of our duties that came under our care. Our duties commenced on the first of March; the Yellow Fever occurred in July; and upon us devolved the entire arrangements for the city of Baltimore in reference to its management. There is considerable discretion left by the ordinances with the Board of Health, that makes them fearfully alive to the necessity of being constantly and thoroughly informed in regard to their duties, and what is required of them. The whole Board, accompanied by the Mayor, went to Norfolk, Gosport, and Portsmouth, made a thorough examination there, came to a conclusion as to the origin of the Fever, and settled in their minds the points that were essential. We returned upon the boat from Old Point Comfort, and after deliberating some time, we came to the conclusion, between twelve o'clock at night and one in the morning, as to the best plan that we should adopt for the city of Baltimore. We went to the Mayor's berth, woke him up, informed him that we had a communication to make to him, and after he had risen and dressed himself, we then proposed the plan to him. "The whole thing is with you, gentlemen. It is not my place to know any thing about these matters; they have been intrusted entirely to you; I will sanction the plan that you have developed."

We then went to the room where the Quarantine Physician was sleeping, waked him up, laid the plan before him, and then we withdrew to confer about the two appointments we had to make. To carry out our plans it was necessary to select two physicians for the performance of certain specific duties; and it was necessary to put them upon duty at once, when we should arrive in Baltimore. We agreed upon the men, but as it involved an additional expense, the Mayor said: "Go on; the Council will surely meet the expense." We reached the city about 5 o'clock in the morning; made an appointment to meet at the "Health Office" at 9 o'clock; I wrote two notes, and dispatched a messenger with them to the two physicians

whom we had selected, saying simply: "Here is our plan; we want the assistance of two men—will you go? one must go to-day; draw straws which of you shall be the man, and then the other must follow." They both held themselves in readiness to perform the duty assigned them, and the gentleman whose turn it was to go that afternoon went, and he continued faithfully in the performance of his duties the whole season. If we had been trammelled by state legislation, do you think that any such promptitude would have been evinced? Thousands upon thousands of our densely populated cities might die by pestilence before the State would come to their rescue. The regulation of the internal sanitary affairs of a city by the State, I think and feel is a great curse; and it is a thing against which I wish to inveigh with all my might in this Convention. But fortunately we are blessed in this respect in Baltimore. I will say, that as a general thing, I think Boards of Health are too large.

Dr. GRISCOM: I would like to ask the gentleman who has interested us so deeply in his description, whether the Board of Health, in Baltimore, have authority to interfere under *all* circumstances, and at *all times*, independently of the general visitation of pestilence? Whether, for instance, if they find Typhus Fever or Small-Pox or Cholera Infantum rife in any quarter, they are at liberty in that case to rectify the condition of the premises where it may prevail, in order to prevent the propagation of the disease?

Dr. KEMP: I take great pleasure in answering the question. The Board of Health, in Baltimore, are just like the Committee of the Whole on the State of the Union in Congress. They do any thing on the face of the earth that they please, if not contrary to the rights of the people. Let me give you an instance. There was a little pent-up place—a dirty miserable place—in which Typhus Fever of the severest

grade broke out. When it first broke out in that place, the Board of Health went in, examined the apartments, and merely said: "This must be cleared out." Said the man: "You shall not clear them out" "Get your rooms disinfected, remove these people from here; if they are not removed in three hours, we will send the whole party to the Poor-House." Yes, sir, the "Board of Health" can clear out any house, if in their estimation the health and lives of the neighborhood are endangered. We can do this; we can institute any plan of proceeding that we please, so as to secure the health of the people.

I will tell you another measure that the Board of Health have instituted. For the last three years, when the spring rains are over, the Mayor has made a requisition upon the Marshal of the Police to give the Board of Health a policeman from each ward, who is required to examine every house in his ward, and report its condition to the Board. We have twenty wards and twenty men. They are detailed from the great body of policemen, and are for that time answerable to the Board of Health. We have blank forms prepared, in which the man enters Number so and so. Say, for instance, he commences at Baltimore street. He tells you that such a building is occupied as a carpenter's shop or blacksmith's shop, or whatever the occupation may be. We have then a column for yards, cellars, out-houses, areas, &c. Wherever the Board have reason to believe that certain premises need to be examined, in order to insure the health of the community, they have a right to enter upon them, under a penalty of \$20. I notified the people two weeks beforehand, that on such a day a general examination was to take place. Policemen were furnished with blanks, and they returned to me in this form:

"No. 1 Baltimore street, dwelling-house, yard dirty, cellar

clean," and so on. When the reports all came into the office, the policemen were instructed to say to the people whose premises were found in a bad condition, "Clean up these places;" and if they would clean them, well and good; if they did not, the policeman had an order issued from the office to clean up their yards, and remove all unnecessary extraneous matters, within five days. At the expiration of the five days, if we found that they had not complied with the order, a penalty of twenty dollars was enforced, and five dollars for every day that the order of the Board of Health was not executed. If any party feels aggrieved by this action of the Board of Health, he has a right to appeal from the penalty to the Mayor. He goes to the Mayor, and says to him: "The Board of Health has made an unnecessary requirement upon me, and for neglecting to attend their order, I am fined \$20."

The Mayor goes to the Board and asks, "What are the circumstances in this case?" "Mr. Mayor, the party was notified, in due time, to clean up his premises, and he would not do it." "All right, I understand it now," replies the Mayor. That is the amplitude of power given to the Board of Health.

Dr. GRISCOM: I should like, with the permission of the Chair, to ask the gentleman another question. It is the practical application of this subject that this Sanitary Convention was called to consider. The description which the gentleman has given of the Board of Health of Baltimore, accords with my own notions upon that subject; but one question arises in this connection. The Board of Health consists of three physicians, who of course are selected with reference to their capacity and cultivation. How do they ascertain the condition of the city? As I understand it, it is through one policeman for each Ward.

Dr. KEMP: I do not want to consume the time of the Con-

vention, but I do believe that we have the best arrangement in this respect of any city in the United States. Therefore I feel more at liberty to speak freely of the manner in which we act. The City Physician, as we term the officer, is myself; and I hold to the city of Baltimore in health matters the same relation that the City Council does in law matters. While the City Counsellor is the legally-constituted adviser of the Mayor and City Council, I am in health matters the constituted legal adviser of the Mayor and City Council. They are at liberty to consult me if they choose. If they do not, well and good. I am required by ordinance to make a circuit of the city within certain times, and if I have reason to suspect that there are any causes of disease more rife than usual, then I must make my visits as often as in my conscience and judgment I think necessary. The Commissioner of Health, who has no other duty to do, must also visit the city in all its parts once in two weeks, and he must have made within that time the circuit of the entire city.

A DELEGATE: Do you mean by that, to visit every house?

Dr. KEMP: No, sir—not the houses.

Dr. GRISCOM: How do you ascertain about the internal condition of the houses?

Dr. KEMP: By the policemen on the beat.

There is an ordinance placing the policemen under the authority of the Board of Health, to execute any order that is issued from the Board of Health to them. That does not interfere with their general police duties.

Dr. GRISCOM: The question is this, How does the city of Baltimore ascertain the internal domiciliary condition of the city at any one time—is it from the policemen?

Dr. KEMP: The policemen are constantly on the look-out;

and it is their business to report every morning to the Health Officer. They do not make an examination of every house every day, but in their rounds it is their business to look about them and report to the Board of Health any thing that exists in their beats that could interfere with the health of the city.

There is one Vaccinating Physician appointed for each ward, and it is his business as he passes along attending to his professional business, to keep a look out also ; and he must make a report to the Board of Health. I myself look at the streets, examine lots, &c., and that I can do as I ride about upon my ordinary professional business ; the City Commissioner must do that also. And then we meet every day, talk over matters, and if any one reports that such a thing needs investigation, we then go and examine it.

Dr. MILLER : The gentleman who has just addressed us, has given us a beautiful description of the sanitary arrangements of some of our cities. We have with us a gentleman who represents the city of Boston (Dr. Clark), who has submitted that the sanitary arrangements of that city are superior to those of any other city in the Union. I wish that we might hear from him in relation to this matter, for I should like very much to get up a little competition between Baltimore and Boston.

Mr. WETMORE : In my haste to close the desultory remarks with which I troubled the Convention, I was not sufficiently explicit in what I said in regard to the influence of physicians in the Legislature. There were in that body two members of the medical profession, one from the City of New York, Dr. S. S. Childs, a gentleman who was sincere, earnest, and faithful in his support of the bill for the sanitary improvement of the city. In my allusion to the subject, I spoke of those who had not made their voices heard upon this subject.

That gentleman did not speak, but was uncompromising in his support of the bill, and he should be remembered with gratitude by New Yorkers. There was another gentleman from a neighboring city (Dr. Frank Tuthill), equally energetic and faithful, and equally desirous of giving us relief, and, if he had chosen, abundantly able to enlighten an audience by the brilliancy of his intellect and the power of his eloquence ; but with a modesty which peculiarly belongs to his character, he remained in silence upon that subject, and only gave us the benefit of his utterance through the eloquent pen which he wields.

Dr. HARRIS: I beg leave very briefly to offer my adherence to the principle involved in the 8th section, and I do it notwithstanding I oppose the adoption of the section in detail. I believe that it was very wisely conceived, and that it does not necessarily involve any action of the State Legislature that would embarrass the proper independence of the Local Boards of Health. I think that the section could be recast, and still the idea be retained, that there should be *in every State a Central Board of Health*. That idea is not a new one. It has been carried out very successfully in Great Britain. It is an idea as old as the writings of Plato, in whose model republic or state there was to be a Counsellor of Health ; and I believe that when sanitary science has reached a higher status, we shall see the propriety of having in each State a general Board of Health ; but that general Board of Health need not at any time embarrass the local Boards of Health. I am not prepared at this moment to submit a substitute for the section, but I clearly see that the author of this able Report, and this draft of an act, has presented an idea that we should preserve. I am exceedingly anxious that in the Empire State there should be a general Board of Health. How that Board should be constituted, I would not undertake to state. Perhaps my ideas would not be acceptable, but I do believe that the ex-

perience of the city and the State of New York fully warrants the belief, that if we could have a sanitary system for this State like that of Baltimore, our sanitary affairs would be greatly improved.

Dr. GRISCOM: I trust that a proper opportunity will be presented to hear from the city of Boston—where the mortality is but one in forty-five of the population—and also from the city of Providence—where the deaths are one in fifty—in reference to their internal sanitary arrangements. For my part I consider that the principle of action which is carried on in Baltimore, is correct, though imperfect in one branch of its labors—the non-medical character of the inspecting officers. I wish that my friend upon the other side of the chamber (Gen. Wetmore) might have an opportunity to detail the contrary picture, the worst sanitary arrangement perhaps that exists in the world, that of the city of New York, which, as a consequence, has a death-rate of one in twenty-seven of its inhabitants. I hope there will be an opportunity presented for such an exposition before the Convention finally adjourns.

On motion, the question was laid upon the table for the present.

The Convention then adjourned at half-past ten o'clock P.M., till to-morrow at ten o'clock A.M.

THIRD DAY—FRIDAY, April 29th, 1859.**MORNING SESSION.**

The Convention met at ten o'clock A.M. and was called to order by the President.

The journal of last evening's proceedings was read by the Secretary, and approved.

Dr. HAMLIN WILCOX, of Philadelphia, and JOSEPH BLUNT, Esq., of New York, were invited to seats as members of the Convention.

Drs. HODDER and HASWELL, of Canada, were received as delegates.

The PRESIDENT: The first business in order will be the consideration of the resolution submitted by Dr. Stevens yesterday, which is as follows:

"Resolved, That in the absence of any evidence establishing the conclusion that Yellow Fever has ever been conveyed by one person to another, it is the opinion of this Convention, that personal Quarantine in cases of Yellow Fever may be safely abolished."

The subject is now open for discussion.

Dr. STEVENS: I do not intend to inflict a speech upon the Convention, and will only make a single remark. I look rather to the immediate practical results of endeavoring to settle a principle, if a principle can be settled, by which future Quarantines shall be guided. It happens unfortunately in relation to our knowledge of Yellow Fever, that at a very

early period of our history, the most eminent medical men, Dr. Rush, of Philadelphia, and Dr. Miller, of New York, upon the one hand, and Dr. Hosack, the preceptor of my learned friend upon my left (Dr. Francis) upon the other, took different sides in relation to the nature and behavior, if I may so express it, of Yellow Fever—the former maintaining that it was merely a high grade of Bilious Fever, which prevails in certain sections of the country, and especially in southern sections—and the latter, that it was a specific disease imported from the coast of Africa, extending solely by germs derived from that original source. I believe I state the position correctly. It so happens, that the spirit of controversy has run so high, that none of us have been able to look at the matter, until now we can look at it historically, and see in what particulars our preceptors and teachers erred. For my part, it is my opinion that Yellow Fever is not a high grade of Bilious Fever, as contended for by Dr. Rush, neither is it capable of personal communication as contended for by Dr. Hosack. It is upon that middle ground that we can find firm footing, and it is there that I would recommend the Convention to take its stand.

Dr. A. N. BELL, of Brooklyn: Before this vote is taken, I take the liberty of stating some experience that I have had, in relation to Yellow Fever both *intra* and *extra* tropical, bearing on the resolution of Dr. Stevens, which I most cordially advocate, that it is not contagious anywhere. I have been so situated as to sleep in a small room, called a hospital, on a little island less than one mile from the coast, in the vicinity of Vera Cruz, presenting an area of less than two acres, for several weeks. For two or three months during the prevalence of Yellow Fever in 1857, when it prevailed in the Gulf Squadron, and in and about Vera Cruz, to a very unusual extent, even for that region, there were within this pe-

riod only two persons in attendance on that island that were taken sick with Yellow Fever. And these two persons were sent to the island soon after they came into the squadron, but they remained long enough in it to become poisoned by the epidemic, which prevailed in so many of the ships there, before going to the island. I myself slept in a room with never less than five Yellow-Fever patients, which adjoined a room containing ten times that number. Here let me remark that this so-called hospital was built of unplanned boards, rough, and calculated to retain all the effluvium with which they were moistened. After joining the Frigate *Mississippi*, a ship which had sent us more patients than any other, and being on board there five days only, I was taken sick with the Yellow Fever, because I was exposed to the full force of the infection. That ship was sent by a medical survey to Pensacola, to be broken out on account of her infected state. Another ship, sent for the same reason, arrived simultaneously—the two together sending over a hundred Yellow-Fever patients into the hospital at Pensacola, where there were already a little more than fifty persons, including attendants, not one of whom took the Fever from the persons transferred from those ships. That, it seems to me, is a strong point in the history of this matter—occurring, as these cases did, at that particular season of the year, the autumn of 1857.

Let me go still farther back than that. I had it from the records of that hospital, and from Dr. Hulse, of the Navy, who had, I believe, during his lifetime, as much experience in Yellow Fever, as any person I ever knew, that a little more than twenty years ago, in 1838, one of the most terrible ravages of the Fever that ever occurred on board of a ship, occurred on board the French frigate *Gomer*. Some of you, doubtless, recollect the circumstances. She went, by permission of the United States Government, to Pensacola and there

discharged her patients. Not an individual belonging to that hospital took the disease, although there were four hundred persons transferred from the frigate to the hospital. At that time, the Fever created quite a panic among the attendants at the hospital. To convince them that their fears were groundless, one of the medical officers of the ship, a French surgeon, wrapped himself, at ten o'clock at night, in the bed-clothes of a person who had died of the black vomit, immediately after the removal of the dead body, and slept there the whole night through, without taking the Fever; and there was not an instance of a person in the hospital taking it. There has not been any authenticated instance, in connection with that hospital, where the Yellow Fever was ever communicated by one person to another.

To recur again to the same island. I returned in the same ship, after it had been broken out and well cleansed, when she was re-ordered to Vera Cruz. Before we got there, there was a new case of Fever on board, and it continued to prevail for three months, till she was finally sent home, and laid up until she was rid of the Fever. Notwithstanding the cleansing and white-washing at Pensacola, many fatal cases occurred afterwards, and she was yet in an infected state. I was transferred to another vessel, a smaller one, the steamer Vixen, which I will name, because there may be persons here who are acquainted with that vessel—a small, ill-ventilated, and crowded ship, that had done a great deal of service in shoal waters, and had been one of the greatest sufferers by the Fever; so much so, that at one time the hatches were battened down, and all hands slept on deck. That was in the immediate vicinity of Vera Cruz, during the prevalence of the epidemic. I went on board of that ship after the Yellow Fever had prevailed, and continued to serve there until the latter part of July, 1858. We came north, in the

latter part of that month, when it was exceedingly hot, and went into the port of Norfolk. The ship was not thoroughly broken out and cleansed. After lying there several weeks in hot weather, she was transferred to the Coast Survey, and continued to serve about Norfolk; but during all that time, no case of the Fever occurred.

In regard to the prevalence of Fever in Vera Cruz, it is well known that the Yellow Fever as speedily disappears on a change of winds from the south and south-west, as it did here from frosts, when communicated through our badly-managed Quarantine.

Dr. STEVENS: What winds come from the north?

Dr. BELL. From the land; from the mountain ridges. I stated yesterday, in a few words, what I wish distinctly to be understood as saying, that the Yellow Fever at Brooklyn was contracted on account of badly-conducted Quarantine.

I believe vessels should be allowed more freedom, and that they should be detained only a sufficient time to give them cleanliness.

In regard to the communicability of Yellow Fever from ships and goods, it seems to me that there can be no doubt about it whatever. The Quarantine buildings are crowded together; our hospitals are surrounded by the shipping, and the very conditions that make persons sick are applied to them, and contribute to hasten death. There are many instances at Quarantine here, as in other places, where persons have contracted the disease, not from communication with persons sick with it, but from being contaminated by the things there contained, or perhaps through the air emanating from them. If any amendment is required to the resolution of Dr. Stevens—that is already sufficiently comprehensive—I should only

propose to amend it by adding, that *things*, and *not persons*, communicate Yellow Fever.

Dr. JOHN W. FRANCIS, of New York:

Mr. President, and Gentlemen of the Convention: I had not the honor of being present yesterday at your deliberations, owing to unavoidable circumstances. I have, however, read the abstract of your proceedings in the newspapers, and am in part prepared to express my views from the limited discussion which has already taken place. It requires something of a parliamentary man to address an audience of this nature, for I see gathered here a large representation of the professional talent of the country, and feel assured that the gentlemen are well armed; that they have studied and thought much on the practical subjects which will necessarily occupy the attention of the Convention. But, Mr. President, I feel authorized to occupy a small portion of your time with an abstract, at least, of some few facts which are, I think, pertinent to the discussion—having, moreover, been solicited by Dr. Stevens, the honored mover of the resolution now before us, to address you. It is not the transactions of yesterday, nor the business of to-day, that prompts me to the utterance of any language in discussing this great subject. I may honestly say I have been a devoted disciple to the study of the history of fevers for just about fifty years, and I may add that I, as a native of this metropolis, as a student, or as a physician, have witnessed more or less every Yellow Fever that has prevailed in this city from 1791, when Addoms, in his Dissertation, described the prevailing epidemic of that year, down to the last returns of the disorder that we have had from Staten Island. I have looked at this disease in all its phases and in every variety of circumstances, during its prevalence in New York of late years, as a

physician, and at Staten Island, officially, in the capacity of Resident Physician. Your enlightened liberality will pardon me if I speak though in limited accents, when I say that I have read three hundred tracts and volumes on the subject ; but what discussion in the history of medical literature has been more prolific than the subject of fevers generally, and more particularly in late years, of Yellow Fever?

As I rise in this place, I propose, with the indulgence of the Convention, in the briefest manner possible, to vindicate the city of New York from the imputation of being the birth-place of Yellow Fever, and to maintain the opinion that as the legislative councils of this State, grounded on medical investigation, were the first in the land who enacted a system of Quarantine regulations, so I believe her rulers will be the last who will abandon them. Yellow Fever, as I think you have stated in one of your reports before this house, and as we find in divers records, medical journals, and the like, from time to time has occupied more or less attention with medical men, since the memorable year 1699, when the Barbadoes Fever made its appearance, as described by Hughes in his history of that island. From that time we find its casual occurrence in New York in 1702, 1742, 1762, and again in 1791. The great work of Chisholm gives us an authentic account of its origin in the ship Hankey at Bulam, on the coast of Africa, in 1793, and of its introduction by that ship in Granada the same year. Here the Fever (called by Chisholm the Malignant Pestilential Fever) prevailed with almost unprecedented mortality. That same year it invaded Philadelphia, and owed its origin exclusively to foreign importation. The Fever of Philadelphia was the Fever of Granada, and both identical with that of the ship Hankey. No fact in medical history is better substantiated, in the whole range of historical testimony concerning endemics, notwithstanding the obloquy attempted to

be cast on Chisholm by the late Dr. Caldwell and others, and by Bancroft, an equally unscrupulous writer. There is still living testimony to the truth of Dr. Chisholm's narrative in this city, in the person of the venerable Isaac Bell, now over ninety years of age, who was an actual witness to some of the leading facts which Dr. Chisholm published concerning the Hankey and the pestilence. In 1795 we again suffered the great invasion of Yellow Fever in this city from importation from abroad, when I lost my father by it, and had nigh fallen a victim to it myself. Dr. Ledyard, the brother of the great traveler in Africa, became convinced that the disorder was an exotic. His experience and observation as Health Officer led him to the conclusion. He had resided in New York before the Revolution, and also after it, and he was well acquainted with local causes. His great discernment rejected the several assigned popular causes of local origin for the occurrence of Yellow Fever, and he was convinced the disease was brought here. I now refer particularly to the Yellow Fever of 1798. The accurate Chisholm, who was a considerable time in this city in 1776 and 1778, corroborates the same statement from personal observation, that no disease of an alarming or epidemical character took its rise here during that period.

If, sir, we carefully investigate the source of the malignant pestilence in 1801, 1803, 1805, 1819, and 1822, I am of the belief that the impartial inquirer will arrive at the same satisfactory result; that each of these visitations was derived from imported pestilence. A like remark may be made touching the causes of the disease in 1804 and 1809, at the Wallabout, and at Brooklyn in 1823, when the renowned jurist and orator, John Wells, of New York, died there from the infection. I am satisfied, moreover, that the conflicting statements relative to the local sources of the disorder, create

doubts as to the veracity of almost all the accounts we possess of its domestic origin ; each writer assigning some peculiar agent as the efficient source of the evil, different, perhaps, from that of another writer on the very same pestilence. The details promulgated as to the immediate agency of the burial-grounds of Trinity Church in the appearance of the Fever of 1822, because the disease first broke out at the foot of Rector street, were abandoned by its most strenuous advocates, with the most unblushing effrontery, after certain ends had been accomplished by a nefarious junto. I will take the liberty, Mr. President, of referring you for certain documents on this point, to the elaborate work of Dr. Townsend on the Yellow Fever of 1822, for ample proofs of what I now utter ; and to that authentic statement on the disease which was published by the constituted authorities, and which may be found in the *New York Medical and Physical Journal*, vol. 1st, as drawn up by the late Dr. Walters, a man of strong powers and intellectual independence. But I must dismiss this head of the subject, and offer a remark or two on the assigned causes of Yellow Fever by those who reject its specific character and importation.

Pages might be occupied with a recital of the almost innumerable sources from which may spring up Yellow Fever, according to the doctrines of the advocates for domestic origin. The great source of this error, as to the origin of the pestilence, has arisen from the preposterous theory so authoritatively first promulgated by the great Dr. Rush, concerning the identity of fevers, the unitarian system, if the license of such language may be tolerated, confounding causes of the most dissimilar nature and effects equally variant, and grouping together under one enormous designation, fevers of different types and origin, under the head of Bilious, Bilious-Remittent, &c., &c. This palpable nosological error, from the distinguished ability of Rush, and his recognized excel-

lence in so many departments of Medical Philosophy, entrapped the unwary, and gave currency to this delusion—"a preposterous dogma," as the classical Bartlett calls it, which led to its wide adoption by some of our most eminent American authors who have published on Yellow Fever. But occurrences of that nature in pathology are not over-rare; we are all alive, even at this present hour, to the extraordinary influence which for a time was maintained by Broussais, with his gastro-enteric theory. Where is it now? And where is the cerebral theory of Clutterbuck, once so popular and so earnestly taught in New York by Dr. Edward Miller?

It is sufficiently curious, Mr. President, to excite our wonder, to consider how many and how different are the causes whose agency is affirmed to engender Yellow Fever. We have had stated atmospheric changes without number, we have had the malign prevalence of septon, or septic acid, like the acidum pingue of De Le Boe; we have had every variety of exhalations from animal and vegetable decompositions, and from every possible compost; new-made ground, and sunken lots, and pools of water in every soil; soap-bubbles of unaccustomed appearance, animal poisons—prominent among which is that of the rattle-snake—the mephitic exhalations of marshes and swamps and church-yards; all these and more have been accused as the source of the pestilence. Nor is this all; the ichthyological source is formidable indeed, though it is difficult to ascertain which was the most noxious power—the fresh or the salt fish; conchology has also supplied causes of the malady. Mr. President, I am aware of your extensive studies of these subjects of medical topography and your long devotion to the cause of truth, and I trust you will overlook the earnestness with which I express myself when I give it as my opinion that the history of medical philosophy embraces

not a clearer or a stronger case of the fixed relationship between cause and effect than that furnished by Dr. Chisholm, concerning the Hankey, as the source of the Yellow Fever at Grenada, and thence in America, in the year 1793. Independently of the lucid account given by Dr. Chisholm himself, in his masterly essay on the malignant pestilence, I may add that the enlightened mind and great capacity of Chisholm, his integrity, his conscientious reverence for truth, all give weight to every assertion he has uttered on the subject. It was my pleasure and good fortune to go over the details with him, in the fall of 1815, at his residence at Clifton, in England, of that memorable controversy which he held, on the specific character and contagious or infectious nature of the Fever he has so ably described, and personal acquaintance with the man rendered it impossible for me to tolerate for a moment the idea that he could be deceived in the premises, or be guilty of an intentional error. His large experience, his massive knowledge, and his earnest investigations scattered to the winds the crude absurdities of his miserable opponents. I have dwelt longer, perhaps, than is justifiable on this point, before this intelligent auditory, but I have felt aggrieved at the treatment he has received from some of our countrymen, and I was, moreover, desirous of restoring a noble author to his proper rank among the medical luminaries of the age, in our great profession.

But the volume of circumstances which might be here adduced to show that Yellow Fever is not a disease of our climate, can be opened in one or two places only at this time. The disease is an exotic, and, as I think, founded on legitimate proofs, in all cases an imported pestilence. It may be engendered on ship-board in healthy vessels sailing from ports diseased of Yellow Fever. Its uniform first appearance among the shipping, adds confidence to this opinion, and indeed is one of our great supports of this theory. Not an instance can be

cited of its origin to the contrary. The visitations at New York proclaim the truth. The same may be said of the cases at the Wallabout, at Brooklyn, at Perth Amboy, at Middletown, at New London, at New Haven, &c., &c., and surely our Quarantine establishment demonstrates its introduction there, almost yearly, by the shipping. The doctrine that the source of the disease was engendered by new-made ground, so long a familiar doctrine with many, fell to naught when it was ascertained that not a single case of the disorder was ever known to spring up in such a locality. No relation of the kind was ever observed of the appearance of Yellow Fever, even at that most notorious depot of loathsome offals and crudities, with new-made ground in the bargain, called, most fittingly, the Collect; and we have no records to prove that the city, even under British misrule, during the whole revolutionary war, with all its noisome sources of sickness, when the direful agents were prolific of many mischiefs, ever gave birth to a case of the disorder. I have often asked of the old Tories who were snugly located here during those perilous times, on the subject; their uniform reply was: We had fevers, dysentery, jail and hospital fevers, but we had no Yellow Fever. Bard, and Bayley, and Tillary, eminent medical men, who were here often as residents, never mentioned a case. Charlton confirms the same story.

Neither the old Sugar House, the prolific fountain of diseases, nor the Jersey Prison Ship, the depot of pestilence, never, so far as I could learn, ever brought forth a case of the disorder. Let it be remembered, that during that crisis in public affairs, we had little shipping, and comparatively no commerce. But I am circumscribed, and can trespass no longer on this part of the subject.

There is another topic involved in the nature of Yellow Fever that deserves a passing remark. I think it is much of

a settled fact that Yellow Fever is a disease *sui generis*, and not to be confounded with the order of bilious fevers. Its cause is different, its symptoms are different from those of Bilious Fever—it may be, and often is, free from every evidence of bile. Its course is unlike that of Bilious Fever, its duration is shorter; its pathognomonic signs differ from Bilious Fever, and its diagnostic sign, as long ago recorded by an old and faithful observer, Dr. Towne, may still be declared in the language he expressed, “The stomach is the seat and throne of the furious conqueror;” it demands a treatment different from that of the several grades of Bilious Fever. What may cure in Bilious Fever, may induce death in the other. It is remarkable, also, that as with Bilious Fever, the patient may suffer a hundred attacks, with regard to Yellow Fever the patient seems rarely to be affected with the disorder a second time, thus adding to our proofs of its specific character and its distinct nosological importance. Lining had noticed this peculiarity, and has expressed himself in most emphatic language: “It is a great happiness,” says he, “that our constitutions undergo such alterations in it as forever afterwards secure us from a second attack.” But Sir Wm. Pym, after laborious and long-continued investigation, first established this fact on a broad foundation. I have said, some of our earlier writers had observed this immunity from a second attack prior to the appearance of Pym’s work, but the cheering fact was most convincingly brought forward by him, with ample demonstration. In 1816 I became convinced that the practical bearing of this fact was of so great importance, that I sought, through the courtesy of Lord Palmerston, of the Army Medical Board, the official documents on the subject in London, fortified by the names of Sir James McGregor, W. Franklin, and W. Somerville, and in a letter from London, to my old preceptor, Dr. Hosack—always so solicitous of information on Yellow Fever—awakened inquiry how far the opinion of Dr.

Pym might be sustained by the experience of American physicians in this country.

Dr. Cathrall, of Philadelphia, is among the very first of our recent writers who stated that the disease did not appear to affect the same person twice, and Rush records that the refugees from the West Indies, resident in Philadelphia in 1793, universally escaped the disorder. My inquiries among our practitioners who clinically witnessed the Fever of 1795, 1798, 1801, 1803, and 1805, have led to the conclusion that a second attack of the pestilence was a rare occurrence, and that it was generally inferred that the human constitution enjoyed, in almost all instances, an immunity from a renewed assault. The solidity of the belief may be inferred, when I mention of these experienced men the names of Bard, Post, Kissam, and Hosack. I trust I do not assume too much when I say that this immunity aids materially in strengthening our diagnostic views of the distinctive character of the malignant Yellow Fever. The disorder has its own peculiar laws. You may strive to commingle it with other fevers, but you cannot destroy its specific attributes.

I pass on, sir, to offer a few remarks on another kindred subject, having, though imperfectly and very briefly, endeavored to prove that Yellow Fever is an exotic, an importable disease, and of a character widely different from the Bilious Remittent Fevers of our country, which have their origin from malaria or paludal exhalations, and in the few words which I shall utter, while I disclaim all intentions of an acrimonious or vindictive import, adduce that sort of testimony which goes to show how unjust some of our domestic writers have been to the climate of their country, and how fallacious have been their assertions as to the real source of the pestilence. No land has been more earnestly libeled by her own sons, than ours by our own who have adopted the domestic theory. The

testimony furnished by the earliest writers, unbiased by theory, on our climate, from De Vries, Van Der Donk, Colden, and Kalm, from the early missionaries among us in their documents forwarded to the Society for the promotion of the Gospel in foreign parts, and a host of others, of equal credibility, have all concurred in demonstrating that our topographical situation was signally favorable to health and longevity; and a true spirit, it would seem to me, would rather offer up gratulations to a beneficent Providence for this delectable abode for humanity, than wreak invectives on the land of our nativity. The untenable declaration, that we live in the latitude of pestilence, and that our climate now, perhaps, "is only beginning to display its tendency to produce this terrible scourge," is a grievous libel on the dispensation of Heaven. Three centuries ago, Verrazzano observed the sparkling waters of our noble rivers, and speaks of our beautiful atmosphere with enthusiastic demonstration, and God and nature are still the same. Let us then confide in the unbiased observations and integrity of these earlier writers: we have not changed our latitude or our longitude; and until these be altered, our climate is the same, nor are we to admit that the primitive man is deteriorated. I think he is still an artistic model in the school of design. Again, if the Yellow Fever were the product of those popular local causes so often most inconsiderately assigned by many, as these causes are perpetually more or less present, we should be doomed to suffer from the scourge continually under such circumstances. Yet how often, and for what a succession of years, are we exempt from this penalty, and when we become thus afflicted, how effective is the black-frost in the destruction of the hydra; another reason for the soundness of the doctrine that Yellow Fever is *sui generis*. Mr. President, I have remarked that you have devoted much time to the subject of sanitary affairs, and I believe with benefit to this community, and one of your Com-

mittees of this Convention has enriched the proceedings of this meeting by an ample exposition of the subject. I could wish that this Convention would not too hastily infer that I look on with indifference as to the effects of these pernicious local causes. Their influence is direful, but they are remedial: a Sanitary Board might with little labor abate the nuisance, and the metropolis speedily do away with the reproach. These domestic sources of disease and death aggravate pestilence of every order and variety, and give wings even to the imported Yellow Fever. The history of this terrible scourge has in a thousand instances rendered this truth palpable to every individual, who has witnessed the wretched medical police under which our city is subjected. Party misrule, vulgar politics, incompetent guardians of the public safety, have for many years past blighted the once great renown which rested with our municipal government; and New York, which some thirty years ago could boast of a ratio of health among its people demonstrative of its hygienic privileges far beyond those of many of the great capitals of Europe, is doomed in the present state of our lax laws, and our impotent and heedless rulers, to bear the reproach of being enumerated among the disastrous places in civilization for health, longevity, and life itself. It is but a few days ago that I listened to the results of an inquiry instituted by a company of officers of Life Insurance Associations, when the astounding fact was declared that our annual mortality amounted yearly to 1 in 25 of our inhabitants. This sets at defiance even Naples. I hope, gentlemen, I do not weary you with these details. While, then, I recognize the vital importance of sanitary laws, for the internal regulation of our police, I beg it may be understood that I have long ago settled the case in my own mind that these local sources of disease will not engender Yellow Fever; they may kindle the flame from the spark introduced from abroad.

If doubts exist in this Committee among any of its members, as to the expediency of Quarantine laws and regulations, I will only advert to the actual results which seem to have followed a more earnest and judicious enforcement of those laws in late years. The frequency of our visitations by Yellow Fever, from those more active and wholesome laws being better regarded, has been comparatively nothing to those of former times, thus demonstrating the wisdom of enactments of that nature, when properly carried out. Nor can I pass over this occasion without remarking how great are our obligations to the late Dr. Richard Bayley, for the labor and intellect he bestowed, during so many years, on this important subject: he met with difficulties arising from commercial interests in his day, as we are wont to experience in these, our own times. But this noble custodian bore down all measures adverse to his beneficent design. He was well countenanced by the philosophical Mitchill, who had early laid before Congress proofs of the importability of pestilence in the bulk or holds of vessels; all of which ended in the enactment of the Quarantine Laws of February, 1799. And I might here pay a passing tribute to that other clever official, in the high trust which Richard Bayley held until his death, by the Fever of 1801; I mean Joseph Bayley, whose letters on Yellow Fever are ample evidence of his close devotion to the duties he discharged as Health Officer. Joseph Bayley's most suggestive letters may be found in the *New York Medical and Physical Journal*. To the valuable papers with which we have been favored by the late able and efficient Health Physician of the Marine Hospital, Dr. Elisha Harris, who now honors us with his presence, I can only, at this moment, make reference.

I stand not here to vindicate the abuses which have crept into the organization of Quarantine laws or their practical working, nor to point out what relaxations might be safely tolerated,

by modifications, which time and experience have suggested. The vast accession of knowledge on the nature of pestilential diseases which we now possess, doubtless suggests great improvements in the administration of these sanitary measures, and I confidently hope that the Convention may prove the efficient agent in furtherance of so desirable an object; but I would be the last man among you who would hazard their abrogation. The Quarantine has indeed become a mighty and an iniquitous burden, but it cannot be said that we have reaped no benefits from it. The exemption of this city from the ravages of Yellow Fever has again and again been demonstrated to have depended upon these laws, and our escape during the last season, with the pestilence surrounding us on almost every side, secured us blessings which atoned for all previous expenditures incurred by that greatly-abused establishment. As an enlarged experience, of late years, has shown the wisdom of improved laws on the subject, so it is equally manifest by recent occurrences, that Quarantine regulations are indispensable to the safety of a people. Nothing more memorable for our instruction can be cited, than the account of the conveyance of the malignant Yellow Fever from the African coast to Boa Vista, as presented to the British House of Commons, in 1847. The documents on this most palpable affair were early furnished me by Dr. Pym, but their substance may be now found in the pages of several able writers. The overwhelming fact of the transferable capability of Yellow Fever, and its spread from New Orleans up the Mississippi, must carry conviction to every rational and unbiased mind. Shall we close our eyes to the perception of these truths—and how are we to solve the problem of the appearance of Yellow Fever in other maritime places, but by the fact that no laws of prohibition existed there, or if they did, that they were violated? Many of this assembly are doubtless now, for the first time, led to the conviction that the scourge

is an imported disease—a conviction imposed on their judgment by the pestilential ravages of 1856, 1857, and 1858. Let Norfolk and Memphis, and Charleston and Savannah speak.

Before I conclude these imperfect remarks on the specific character, the foreign origin, the communicable nature, and the distinctive characteristic of the Pestilential or Yellow Fever—and for the courtesy thus extended to me I tender you the homage of one who has already trespassed too long on the indulgence of a listening audience—I shall utter a few words on that special matter which is so closely dove-tailed with the very spirit of the resolution offered by Dr. Stevens. There are, doubtless, gentlemen in this Convention who have adopted the opinion that even in these latitudes, Yellow Fever may be of domestic origin, a home-bred disease; but I feel an inward monition that many, very many are decided as to the fact that Yellow Fever is an imported pestilence, and that this view of the disorder has secured a numerous party springing out of occurrences which have taken place since 1855-'6. It would absorb too much time (continued Dr. F.) to scrutinize the several histories of Yellow Fever which have been reported, affirming it to be of domestic origin, but a glance at one or two might not be misplaced. The famous record of the Fever at Gallipolis, given for our instruction by Andrew Ellicott, and which has been extensively promulgated as Yellow Fever of the interior country, was subsequently admitted by Ellicott himself as an untenable account, the author acknowledging that he had never seen the Yellow Fever of our cities, and that his decision had been made on analogical reasoning. Long ago I exposed the statement, and I rejoice that the error was exploded by Dr. Drake, of Cincinnati. Years ago with exultation it was announced that Yellow Fever had arisen from domestic sources at Bristol, in Pennsylvania, and the theory of native origin might now rest, it was thought, on

irrefragable proof; when lo! William Stevens, of St. Croix, the author of that novel work on the Blood, instituted a minute investigation of facts in the premises, and found the birth of the pestilence to have been derived from the exposure of a sailor's clothing, who had died of the Fever, and which had been locked up for some nine or eighteen months. These examples must suffice with a reference to the Facts and Observations, and the Additional Facts and Observations of the College of Philadelphia for fuller illustration. Other authorities might be pointed out.

That Yellow Fever may be produced from exposure to the air emanating from merchandise derived from an infected city, is a conclusion deduced from innumerable instances; even the strongest non-contagionists have recognized the fact, as Fenner, Drake, and others. Of the personal communicability of the disease from one person to another, doubtless an honest difference of opinion has prevailed. The testimony for and against the doctrine, has been the great subject of contention with the faculty for more than half a century, and it is due to the talents which have been displayed on both sides of the question, to admit that the controversy has been characterized by great ability, and that light has thereby been thrown on the vexed subjects of endemic and epidemical diseases. The whole discussion has, I think, been honorable to the intellectual acumen of the American faculty; but neither party has yet sunk into submission. A sincere and impartial observer of the disorders which "flesh is heir to," will, I believe, admit that there is such an agent as contagion, notwithstanding this principle in disease has most unwittingly been denied by some of our authors, as characterizing several of the most formidable infirmities, hitherto acknowledged specific and contagious, as Plague, Typhus, Scarlet Fever, Puerperal Fever, and the like. Lamentable, indeed, is the circumstance that in this age of philosophical research, when nature is interro-

gated with all the aids of previous data, that such an adventurous doctrine should be proclaimed by some of our best medical authorities on other topics of investigation: because, forsooth, contagion is not palpable to our senses, as we might witness the buffalo on the prairie, we are to discard *in toto* its agency. There is an ultimatum, beyond which we are not permitted to penetrate, and it behooves us to rest satisfied with effects, when the primary source is not to be divined. Let the army of scouts ransack nature for ozone, and let the microscope do its part in exploration; be it our duty to acknowledge that the whole is a mystery, and that the pestilence walketh in darkness, yet with unerring power, in the accomplishment of its destructive work. We know in part only, and let us be reconciled to our condition. Our illustrious predecessors in the healing art had, with a matchless perseverance, ascertained many of the laws which controlled this secret agent; and these laws rightly comprehended as a rule of action, might save millions of lives. Huxham, Lind, Pringle, Blane, and Haygarth were among the prominent benefactors of their species who had expounded these laws for our benefit; and Watson, of England, and Dickson, of America, have recently joined in the service; and had their decisions been more generally understood, the heterodox assertions of many modern writers on fever and specific disorders would not have found insertion on their pages, to the detriment of philosophy and our disgrace. All this, Mr. President, may be a little old-fashioned to the abettors of late doctrines, and I—with what courtesy, I leave to others to determine—may bear the stigma of one loitering behind this enlightened age. But look at the history of theories and opinions. The morbidic lentor, the humoral pathology of Boerhaave is in part—and in no small part either—revived, and Liebeg proclaims the assimilatory or fermentative process recognized almost a century ago by Walker. The disease of

the blood is again a pathological fact, and so it will prove with regard to contagion and its morbid capabilities. The great principle stands, with modern science, in strongest attitude before us. Man is a portion of what surrounds him, and the functions of organic life sustained by their peculiar laws, are modified by the air he breathes, the water he drinks, the food that nourishes him, and by the very occupation in which his energies are expended. The solidists are compelled to give up their once strong hold. An exclusive nervous theory is defective, and the complexity of the assimilating powers tells us of man's subjection to noxious agencies, and that while the laws of life enable him to hold in abeyance, to a certain degree, specific causes, inexplicable evidence compels us to recognize the generating development of contagion and infection in his own individuality. We are forced, therefore, to admit the contagious principle more or less intense in different orders of fevers of a continuous nature, and Yellow Fever is one of those disorders, and hence communicable from one person to another. Shall we demur the recognition of this law because we are embarrassed in the solution of its attendant phenomena? Who had ever dreamt of the contagion of Small-Pox, till Sydenham expounded it by exact observation? After all that has been written on fevers, I shall be the last who will yield to the sophism that contagion is a non-entity, a fiction of a disordered imagination—a phantom of the brain. Because the quadrature of the circle has not yet been demonstrated, shall we give up mathematics? Shall we discard religion because it has its hypocrites; or the providence of God in the fruits of the earth, because there are snakes in the grass? Let us, with all our lofty aspirations, study humility.

Among the most prominent of our domestic writers who at an early date denied the specific nature and contagious character of Yellow Fever, was the late Dr. Edward Miller, of New

York. As a scholar and a gentleman, he was the admiration of all; he evinced no small ingenuity and talents in support of his argument, and his Report on the Fever of 1805 has proved the basis of most of the theoretical opinions on the question, which have been promulgated since. He was the preceptor of our friend, Dr. Stevens, who introduced the resolution now before you; and if the dangerous and untenable doctrine he espoused could have been sustained, Miller was, above all others of the faculty of that day, its ablest champion to vindicate it.

———"Si Pergama dextra
Defendi possent, etiam hæc defensa fulscent."

The elaborate Report of Dr. Miller, after some time had elapsed from its first publication, was scrutinized with singular ability, and its fallacies brought to light in an extensive review of its assertions and theoretical and practical bearing, in the American Medical and Philosophical Register, vol. 2.

So unexpected to the popular opinion concerning the origin and nature of Yellow Fever were the sentiments expressed by Dr. Miller, that the better to fortify his exposition he had recourse to a circular address accompanying his Report, signed by several of the members of the faculty, who hesitated not to declare that his Memoir on the malignant pestilence "contained a transcript of their best and most matured opinions," and at the head of the list, who thus signed, was Dr. William Moore, who had only a short while before authorized the following testimony, directly the reverse of Miller's doctrine. I extract it from the account we had of the first Yellow Fever after the war of Independence. "Dr. Wm. Moore, an eminent physician of New York, informed me (says Addoms, on the Fever of 1791), that a gentlemen from Lime, in the State of Connecticut, was on a visit to this city, when he became a patient of his, on whom the disease was very evidently marked, attended with large vibices; he, however, recruited

considerably before he left the city ; on his passage to Lime, he relapsed, and died shortly after he reached home. *The greater part of this family caught the contagion, and soon after became affected with a similar disease, which proved fatal to his mother and some other persons in the family.*"

Here we have direct proof that the emanations of the sick body caused a like disease in others. Yet the worthy Doctor vouches to Dr. Addoms for the truth of the very opposite doctrine advanced by Miller. In the history of delusions, I think I have sometimes discovered periods in which the public mind seemed especially susceptible of the magical influence of certificates. It was assuredly so about the time when Dr. Miller's Report appeared, and he wisely availed himself of the advantages that might be derived from the measure. Only a little before, both in this country and in Europe, Perkins, with his metallic tractors, was fortified by the testimonials, in the form of certificates, of many eminent individuals, among them the noted heads of the Church, and laymen of high consideration, testifying to the curative efficacy or remedial powers of his preposterous invention. It was no uncommon occurrence, in the days of Dr. Miller, to flood the public press with documents of that sinister nature.

Of the Fever of 1795, I shall state my own individual case, to illustrate its communicability. My father contracted the disease in October of that year, and died on the 23d of that month. The day before his death I was seized with the pestilence. I could never learn that the infected district had invaded that part of the city in which was our residence, near the head of Pearl street, nor that I had, as a child, aged six years, wandered at all from the premises. Personal communication about the sick-bed of my father had engendered the disease. I was informed that my prescriber was Dr. Wm. Pitt Smith, who died shortly after of Yellow-Fever. I narrowly escaped, and well remember my coffin set up in the cor-

ner of the room; for in those days of dismay the patient was scarcely dead before interment took place: you were hardly cold before the grave received you; such was the dispatch with all classes of citizens.

But I cannot enlarge on this subject at this time. Few in this assembly will be disposed to combat the doctrine of contagion as applicable to Typhus and Typhoid Fevers; the specific contagion of these diseases may by circumstances become concentrated in virulence or diluted in power. We all know their influence is checked or entirely arrested in the open air. So it is with Yellow Fever; the area of its contagion or infection is circumscribed, yet it produces its like, and after the manner of the Asiatic Cholera, while its integrity or nosological attributes are not destroyed, it may be fostered and spread by concurring causes. Originally engendered, *de novo*, impurities cannot change its nature, but may augment its influence. There is, probably, not one in this Convention who is not more or less acquainted with the limited sphere in which the contagious and infectious property acts. Haygarth, long ago, after great devotion, had set these limits with these Fevers, within some eight or ten feet from the infected body, and my personal interviews with him, years after, gave me assurance that he had had no subsequent reasons to alter his views. Diagnostic differences are maintained, but each disorder triumphs in its own individuality. We have recorded proofs enough to satisfy us on this head. The Yellow Fever records of Dr. Channing Moore of Staten Island, of Dr. Wistar of Germantown, of Dr. Hosack, of that of Huntington, Long Island, of that of New Haven by Dr. Munson; the conjoint report of Drs. Hosack, Bayley, and Douglas on that of Perth Amboy, New Jersey, &c., &c., are sufficient to show that Yellow Fever is not to be confounded with Bilious Remittent Fever; that it has its pa-

thognomonic signs as a disease of a widely different character, and that its contagious nature is at times manifested even in the pure air of the country. But I must desist.

I beg to be permitted to add a few more words. The measures proposed to be recommended by the Convention, for legislative or municipal enactment, are fraught with mighty import; and if, upon a decision of the question, I shall stand alone, I shall rest satisfied that I have done no more than my duty. I may say—I trust with becoming deference—I have never shrunk from the duties inseparable to a medical man. No sooner had I learnt that an attack of the Yellow Fever secured the human constitution from a subsequent invasion, than I felt fortified in obligations still greater by which I was bound to exercise my humble abilities in mitigation of the horrors of the afflicted; and as to researches into the causes of the calamity, I have freely given as much time and attention as circumstances would permit. In the Yellow Fever of 1819 and of 1822, I was an earnest man, and I might dwell on the perplexing scenes which practice presented to the medical prescriber, how slender for the supply of the pocket, how full of demands on the humane affections. During the existence among us of the Asiatic Cholera, ten years after (1832), the afflicting spectacles afforded by disease of pestilential character were more numerous, and still more formidable; but all brought convincing proofs of the horrors of specific disorders, and the powers of specific infection. My midnights on the graves of old Trinity church-yard, were spent in fruitless efforts to discover any noxious agent as yielding even collateral support to the spread of the Yellow Fever. I could find no pabulum for the specific poison of that pestilence in that locality.

Am I then to reject the vital principles of etiology, which the soundest discernment has discovered, and which

time has consecrated? After a study of the labors of the most practical men and most astute minds, with such facts as my own observation has presented, I have arrived at the conclusion that a contagious principle lurks in the Fever now under consideration, and that it sometimes manifests itself to our confusion and dismay. It falls not within the category of Small-Pox; and Ship and Typhoid Fevers may prove more fatal to medical attendants; but if we discard the quality of contagion, we rob continued fevers of one of their characteristics.

But after all, how capricious is the influence of contagion! The poet of the Revolution, Philip Freneau, assured me that while pestilence raged on board the Jersey Prison Ship, and Small Pox was dominant in that receptacle, at least sixty or seventy of the American soldiery, who had never been inoculated, escaped the disorder, though, like himself, exposed under the most adverse circumstances to the poison. How easily might we cite kindred examples of other forms of specific disorders, as Scarlatina, Measles, Hooping-Cough, &c., and what instruction do facts of this nature impart! Our Bible tells us the pestilence walketh in darkness; we are not permitted to perceive it standing palpably before our eyes. God knows it is enough to encounter and toil against its mischiefs, as conscientious medical men. But let me, with all due deference to this enlightened delegation, ask with becoming humility, what advantages are to be secured either to our profession or to the public at large by adopting this resolution? You say in your contemplated resolve, there is no evidence of the personal communicability of Yellow Fever, independent of fomites, by which I infer you admit its contagious or infectious nature when such agencies are present. How are you to liberate the afflicted patient from the action of fomites, or the by-stander who occupies his room and surrounds his

bed? Every thing, it is suggested, is to be removed; if there be a deficiency of electricity, I suppose it is to be restored; the patient is to be divested of all apparel; and thus with proper ablutions, you say, he becomes innoxious. The clothing which he impregnated with the emanations of his pestilence is to be carried out of sight. But of the patient himself, the immediate source of all the poison, the generator of the fomites, what of him? Shall every tangible portion of his body, where the evil may lurk, be subjected to certain nameless operations? Is he to be shorn? Is he to be denuded? If a bank-bill that has had some currency among many hands can circulate the Fever by its transmission from one person to another (as has been asserted by the very authority which denies contagion), what is to be the lot of the patient himself, the fountain of all the evil? In other words, gentlemen, you tell us, Remove every source of contagion, and then the patient is unable to spread Yellow Fever. Pardon me, if I think I am warranted in saying—this doctrine is neither deferential, nor inferential, nor consequential. It is a negation. Well, after all, thus safely ensconced in the ark of safety, little may be dreaded of the troubled elements. A particle of these wonderful fomites, even of an impregnated bank-note, may spread desolation and death; the corrupt or diseased patient, the source of all the danger, is, however, an impotent and harmless mass. If this is the theory espoused here, I am strongly reminded of a nursery couplet that I early learned:

"South Hampton's wise sons found the river so large,
Though 'twould carry a boat, 'twould not carry a barge."

Will you elevate the scientific character of your country by carrying this resolution? I apprehend not; the suffrage of the masses is against you; but what is stronger, the knowledge of — the times gives you no countenance.

Better things are expected from you ; enlightened Europe, for years past, has cast a favorable eye on the deliberations and labors of the medical faculty of the United States. Wisdom has been found in the pages of her writers ; they have enlarged the number of materials of curative power ; they have advanced pathological principles, and justified them in practice. I fear you will jeopard these agreeable honors. What you determine to-day may prove a lasting reproach ; perhaps a signal defeat.

It is impossible that any mercenary considerations can invade your bosoms : such influences are at war with the whole tenor of a medical life, whose direct province it is to rescue humanity from human sufferings, whatever may be the sacrifice of the medical prescriber. You will not fancy a new inspiration which renders you vain-glorious enough to pronounce obsolete the accumulated wisdom on the laws of pestilence, which our illustrious predecessors have discovered, after centuries of investigation. Your penetration I deem to be hardly superior to that of other mortals, by which you can claim a prescriptive right to adjust difficulties hitherto among the inextricable phenomena of mysterious nature. Let us at present rest contented with the progressive condition of our science, and turn to the best account what has been achieved by our predecessors, reflecting that hecatombs of lives have already been lost in the uncertainties of party strife, ere the knowledge we now enjoy had been secured to us. Nor can I fathom that wisdom which would renounce the opinions of so many years' growth, and of such ample observation. Bewildered by the novelty of strange doctrines, you may imagine that adherents will rise up to your support ; but with due respect to the talents on this floor, I beg you to investigate the confidence you can safely place in their cited authorities. I solemnly affirm, that with the most lenient disposition, I am compelled to reject a large portion of the documentary evi-

dences, which I find in print in the *Medical Repository*, on the subject of Yellow Fever, from the fact that my long life has enabled me to comprehend by personal communication, the authors of many of the statements which have obtained an unjustifiable currency, as reliable proof, and I know that a competent tribunal would set at naught no small portion of their asseverations. With two of the editors of that popular journal I enjoyed a delectable intimacy, and time made me acquainted with many of their correspondents; but editorial life and professional association never so far blunted my perceptions, as not to see that the delusions of theory often obscured the clearest facts, and that a pernicious doctrine, a leading idea, made subservient to its ends, the facts and circumstances, now quoted in opposition, that might otherwise have been triumphantly brought forward at this moment, in vindication of principles, such as I almost fear will scarcely be recognized by the new light which has burst on the profession. But I shall console myself with the reflection, that while popular delusions have yielded a crapulous renown; yet like the exhalations of a noisome vapor, they necessarily, by a law of nature, in due season die away, and are forgotten.

Your purpose, doubtless, is honest, but may it not prove delusive? You have a legitimate right to pronounce a decision, but is it far-seeing, so to act? I have overlooked many circumstances which, if detailed here, might strengthen the reasons I cherish against the passage of your contemplated resolve, because I dare not longer absorb your time. The death of seven of your Port Physicians out of ten, is a fact of much significance. The perplexing and vexatious questions inseparable from the agitation of the nature and laws of contagion and infection, which have challenged the astute minds of our profession for two centuries, from days prior to those of the great Huxham down to the period of the still greater Blane, demand a severer scrutiny in order to arrive at the

truth, than I fear the Convention on the present occasion, with all its literature and practical knowledge, has at command. You must have received an inspiration rarely vouchsafed to humanity, if you are ripe for action.

I was incidentally informed that it was more than probable that our present Convention on Quarantine and Sanitary regulations would, to some extent at least, be influenced by the Report on Yellow Fever presented to both Houses of Parliament by command of Her Majesty, in 1852. I am not unacquainted with the substance and aim of that elaborate document. It is enriched with the contributions of eminent men in our profession, both foreign and American; but I am constrained to say, debased with the opinions of not a few whom I deem unworthy of full reliance. Our profession is often engaged in "novelties which disturb our peace." Recently, we are told, the venereal is cured without mercury, and, as if this was not cheering enough, we have, still later, a volume to demonstrate that lues has no contagious property. Many of the cardinal principles which justly control our views concerning the nature and origin of Yellow Fever, are in the British Quarantine Report, amalgamated with errors, known by our faculty to be wholly at variance with the facts as presented to every observer, of the recurrence of the disease in New York, and in other sea-port towns. The blending together in one indiscriminate mass, fevers of different types with the pestilence, is another gross mischief. The history of the disorder, at its invasion and in its progress, is irreconcilable with such a nosology. The introduction of the disease and its spread, are at war with every other theory than that admitting it as an exotic, and coincide with the belief of its infectious or contagious character. The emanations of the afflicted sufferer produce a like disorder. Moreover, it may further be affirmed that the documentary communications of the Report, by their variety and conflicting statements, impair the force

of legitimate inferences, and manifest too often the pride of opinion and the power of self-delusion. Nor do I like that American physicians who have struggled with the scourge so often and so faithfully, men who at great cost have given the weight of a large experience in studies devoted to the acquisition of sound knowledge in our most formidable diseases, should be displaced in public estimation by writers who, with all their qualifications, could not claim the immediate wisdom derived from our own soil, or climate, temperature, and topography. Science is of no party, and the geographer would err who would set bounds to her limits. There is no one in this Convention who entertains a higher opinion of British Medicine than I do, and my personal acquaintance with many of the noblest cultivators of the healing art in Great Britain, has been among the cherished blessings of my life. My vision at this moment beholds Chisholm and Haygarth, Pym, McGregor, and Blane, the greatest of them all. I have often thought how true was the description given of the faculty by the great moralist, Dr. Johnson: "Whether what Temple says, be true, that physicians have had more learning than the other faculties, I will not stay to inquire; but, I believe, every man has found in physicians, great liberality and dignity of sentiment, very prompt effusion of beneficence, and willingness to exert a lucrative art, where there is no hope of lucre." But notwithstanding all this, we are obligated not to overlook the honorable labors of our own countrymen. The north and the south, the east and the west, have yielded us gifts in medical literature, obtained at a high price, the devotion of years, and the sacrifice of life itself. Pardon me if I add, let your deliberations, therefore, be mature; let the widest and most minute inquiries be instituted; let the accumulated facts recorded from the actual experience of our sound clinical masters be the study of that time you purpose to bestow on this great and perplexing subject. You

will lose nothing by so doing. No pretext can baffle the force of such a result. You, in your catalogue of the orthodox, can reject the mongrel combinations of Bancroft, and the perplexing varieties of Johnson, of the *Medico-Chirurgical Review*; you will place but a doubtful reliance on the effusions of Noah Webster, and his collaborators. You, amidst all your deliberations, will bear in memory that some few years ago scarcely a dozen physicians in the United States believed that Yellow Fever was an importable disease; now, at the present hour, hardly a dozen might be found who will not bear witness, from recent occurrences, that it may be and is introduced from abroad. The astounding facts brought to light, amidst the shipping at the port of New York, render the belief of its exotic origin a demonstrable truth. Wait a little longer, and closer investigation will solve the problem of the communicability, or contagious or infectious nature of the Fever. It cannot be an anomaly. It must obey the laws of continued fevers of animal and specific origin. If the supposed necessity for a decision on your part is imperative, let the decision be such as will avoid the hazard that a future Convention may reverse your fiat, and thus render your proceedings the laughing-stock of the people. I may be oversolicitous of the result, but my heart is with the noble profession of healing, the greatest of studies to which intellect can be appropriated; the most beneficent of pursuits in which mortals can engage.

As I entered within the walls of this Convention, I was struck with the abilities that surrounded me. I saw Dr. Harris, who has appropriated talents and time to the elucidation of the pestilence; and the distinguished Professor of a neighboring University, Dr. Wood, is of the audience. On my right I find the friend of many years' acquaintance, Dr. La Roche. That calm and benignant man, that scholar and student in the branches of philosophical research, the author

of that stupendous work on Yellow Fever, which has excited the admiration of all, even of this Convention, struck me with peculiar interest. I have not been indifferent to his wondrous labors, for I have found in them the records of my earlier readings. I wish his publication had been suspended till he had personally investigated the occurrences of the last year in our beautiful bay and surrounding waters: I wish he had studied the season of the year before at New Orleans, Norfolk, Memphis, Charleston, &c., ere his great work had been given to the world. had he been thus fortunate, my conviction is that some opinions he has advanced would have received a new interpretation, and that not a few of the cardinal principles he has cherished would have been radically modified. "Truth and goodness are one," says Lord Bacon; and the purity of purpose which illumines the extraordinary performance of the learned Doctor would shine with additional lustre for the elucidation of the greatest subjects involved in the field of medical controversy. My reflections on the elaborate report of Dr. Fenner, on the New Orleans pestilence, bring to recollection the eulogy pronounced on Leibnitz—"He crushes by the force of expression;" and, in contemplating his story of disease and death, we recognize a right heart, yet, I fear, a wrong theory. But I live to think this generous writer will find new motives and new reasonings to enrich his future labors. I have also in memory the minute inquiries and results of another philosopher—Dr. Barton, of New Orleans.

The contagionists, or, if you please, the infectionists, are not, however, to despair. My old preceptor, the eloquent Professor Hosack, with ample clinical experience, has fortified the citadel of truth with dexterous and effective weapons, and the old ordnance is still capable of modern service. Like Sampson among the Philistines, he had many and long-waged contests; but, unlike the judge of Israel, died unshorn. Had

he lived to the present day, his triumphs in argument would have been further corroborated by the recent history of the origin and specific character of the imported scourge.

But let none lament events beyond control; let us rather rejoice in the favors bestowed on this our own generation. The illusions of past days which betrayed so many, are rapidly vanishing from our sight, and our vision, we may hope, will ere long be unclouded. Prejudices, which long bound us in this spell, have been dissolved by the power of untrammelled researches, and that authority which rests not on ample experience, finds little favor with the discerning and the true. The venerable art of Physic may rejoice in the accession she had made to her precious treasures by the late publication of Dr. Dickson, "The Elements of Medicine." It is not easy to exaggerate the value of this great work, the latest, I believe, of the accomplished author. His nosological discrimination, his etiological investigations, his descriptive powers, his therapeutical resources, unfold the treasures of a large capacity and a discriminating judgment. Our fevers are treated by him with a mastery which swells our admiration of his classical style and his independent reasoning. There is a mellowed excellence in his speculations, and a candor in all he says, which demonstrate the true spirit of a medical philosopher, and yield assurance that his fame is not of temporary duration, or circumscribed by geographical limits. Judging from the tenor of his great work, I feel convinced that could his eloquent voice be heard in this hall, it would be uttered against this ill-timed resolution. I have done.

Mr. VIELE, of New York:

I move that the resolution be referred back to the Committee. There are too many laymen here to decide upon a purely medical question. I was myself five months at Vera Cruz,

and buried over a hundred men who died of the Yellow Fever. I slept in the same tent with a man who died by my side. Yet I am not prepared to give a vote upon this subject; and I hope medical men will not compel non-medical men to vote upon a purely medical matter, upon which there is discussion between doctors, for "when doctors disagree, who shall decide?"

Dr. CLARK, of Boston:

I do not believe medical men differ at all upon this subject, and I believe it is as well settled as that persons shake with the Fever and Ague, and that Quinine is good for it. I was going to propose that the lay members should be excused from voting.

The PRESIDENT:

The Chair would state, that a previous Convention adopted the rule, that in every question where a principle is involved, the vote should be taken by the societies represented, each having one vote, and the present Convention has decided to follow the same rule.

Dr. STEVENS:

I do not rise to reply to the very interesting speech of Dr. FRANCIS. I am very sorry that a little more of it was not pertinent to the resolution before us. I have lived long enough to view with great skepticism things I have not seen myself; and I trust every prudent medical man will be guided more by observation of facts that have come under his own experience, than all the unauthentic stories of past years and past times, when people were too blinded by their passions to look at things as they really were. I ask you as philosophers, as men who are prepared only to found their deductions upon certain data—I ask you if the observations of four or five

epidemics in the city of New York, presenting ample opportunities for the action of personal contagion, have enabled Dr. Francis, or any one, to lay his hand upon a particular case, and say, There is a case of indisputable contagion. Now, I ask for such a fact; and in the non-production of it, I hold that the mass of contagional evidence within the memory and knowledge of those here present, is such as to render it infinitely improbable that Yellow Fever in this city, and this climate, is capable of being personally communicated; and if such is the fact, we are bound not to withhold that precious knowledge from those who are suffering from the want of it, and who are subjected to unnecessary restrictions in the way of prevention. We are bound to make that annunciation as soon as we can do it with safety, and if we can do it with safety, let not gentlemen come forward and throw us back. Why will gentlemen boast of their learning, and the extent of their reading, and yet withhold from us the truth as derived from experience? Our experience tells us we are right; then let us go ahead, for we can do it with safety.

Dr. BELL, of Brooklyn:

I desire to present this addition to Dr. Stevens' resolution. "Provided, that fomites of every kind be rigidly restricted." In reference to this, Mr. President, I would like to allude to some of the circumstances of contagion which seem to be suggested by Dr. Francis. I mean to say *contagion*, though that is a word which I do not believe in; but in quoting these cases, Dr. Francis referred to the English experience on this subject. I have never seen much of African Coast Fever; but I have seen some of which England tells us so much. I have been there too, and to the worst places where Yellow Fever has prevailed on the coast of Africa, and at the Island of Ascension. A few years ago, some British ships coming from the coast, where they had Yellow Fever,

concluded to go to the Island of Ascension, where Yellow Fever had never been known. They had been there only two weeks, when it spread like wild-fire, and large numbers died. It was at the time strong evidence of contagion; but since then they have demonstrated the fact to consist not in the contagiousness of Yellow Fever, but the conditions of soil and climate of Ascension. It was sowing seed in good ground; it was a good rich garden-soil, filling the atmosphere with food for the Fever; and in that way the inhabitants were supplied with the poison. What did England do? She sent her ships to St. Helena, where there was solid rock, and none of the soil to favor an epidemic. They took their ships there, with all the filth collected for twelve months on the coast of Africa, and though the persons sick with the Yellow Fever were dispersed throughout the island, the inhabitants did not catch it, because it was not communicable. Such was the case in 1856, as Dr. Francis has demonstrated. The same thing occurred in Norfolk, in 1855. Why was it, I would ask, in 1858, when the ships came from the Gulf with cases of severe epidemic on board, they did not communicate it to Norfolk? Simply because there was not that degree of moisture and heat necessary to spread it. The same thing occurred here; for you find the same concatenation of causes, the same degree of moisture and heat, and the same meteorological conditions. I believe it would not be too much to state that in proportion as we approach the conditions essential to the rise and spread of the Yellow Fever at the delta of the Mississippi, do we find Yellow Fever to prevail.

Let me ask, why was it that, after the burning of the Quarantine Hospitals, some of the Yellow Fever patients did not give the Fever to other persons? Why is it that the persons set free and taken into our city escaped disease? I have not heard of a case of these imprisoned persons who had the disease after they left there; and yet it is no uncommon

thing for those who are detained in ships at Quarantine, near the hospitals by which they are surrounded, to take the Fever and die of it.

Dr. FRANCIS :

I know very well the old phrase, that "Pestilence walketh in darkness." I do not believe there is a gentleman of the medical profession in this hall who does not believe the small-pox to be contagious. I take it for granted that that is a pretty well-settled axiom. Philip Freneau told me that, in the revolution, when prisoners were so crowded together in the old Jersey Prison Ship lying at Wallabout, out of ninety-four persons who had never had the small-pox, and had never been inoculated, only about forty took the disease.

Dr. GUTHRIE, of Memphis :

I rise simply to make an explanation, because it has a bearing upon this very question. I am reported in one of the morning papers as having said yesterday, that when we had the Yellow Fever in Memphis, in 1855, we had Quarantine. My remarks referred to the existence of a Quarantine at New Orleans. We have never had a Quarantine at Memphis. In 1854 they had no Quarantine at New Orleans. In 1855 they had reëstablished Quarantine. In both summers Yellow Fever prevailed up the Mississippi River, and here the facts I state will bear upon what my friend Dr. Francis states. In 1854, there were landed in Memphis from the steamboats passing up the river, over forty patients, a majority of whom died of well-marked Yellow Fever. In that year not a solitary case of the Fever originated in Memphis, or was communicated by the patients dying there to any other person residing there. In 1855, on the 2d of August, the fever made its appearance from the boat Harry Hill, which was communicated to the Ingomar. The Harry Hill went to New Orleans, and the

Yellow Fever did not become epidemic and spread in Memphis until after her return from New Orleans. Her furniture was then taken out, and she was unloaded, and from that time the disease spread through the city.

I wish to make also another remark in connection with this subject. I am reported as having said that the southern part of our city was well paved. In reply to a question of my friend Dr. Kemp, I said that the section of the city where Yellow Fever had most prevailed was a newly-graded section of the city, but it was not paved. There is no street pavement in Memphis, and it is a gravelly and sandy soil.

Mr. HALLIDAY, of New York :

I hope the resolution will be laid upon the table, and that gentlemen will not press it to a vote at this session of the Convention, for I do not believe that we are yet prepared to vote for it. I can say with the venerable gentleman (Dr. Francis) who has addressed us, that I am not prepared to vote for it.

Dr. HARRIS, of New York :

I beg leave to differ from the gentleman who has just spoken, for I believe there is not a medical gentleman in this hall, who is not prepared to vote for that resolution when properly modified. I deem it desirable that we should vote for that or some similar resolution, by which this Convention shall declare itself *against personal Quarantine for Yellow Fever*. Practically, there seems to be but one opinion relating to the propriety of such a resolution, for even the few remaining disciples of Pym and Chisholm confess that the Fever is not personally communicable in a pure atmosphere. The few instances adduced in support of that hypothesis are all open to criticisms and doubts, which destroy their value as proofs of contagion.

We did not understand the venerable Dr. Francis as opposed to the object of Dr. Stevens' resolution. Dr. Francis has given us the history of Yellow Fever as he has seen and studied it, and no physician has seen and studied diseases more intelligently. He was the first man to report to the profession of this country that great essential characteristic of this Fever—the fact that the human system, under ordinary circumstances, is susceptible to the operation of this malady but once. Dr. Chisholm, the author of that doctrine, believed the Fever to be contagious. Dr. Francis believes the same, and for similar reasons; Dr. Francis has given us his interpretation of the facts which appear to favor the doctrine of contagion; but he has presented no proofs that the propagating cause of Yellow Fever ever has been, or ever can be, communicated by, or reproduced in the human body. It is true that Prof. Dickson, Prof. Fenner, and a few other distinguished observers of this Fever, hold to some modification of the doctrine of contagion, but they do this more as ingenious theorists than as observers of facts.

Shall the present vexatious and dangerous system of personal Quarantine for Yellow Fever be longer kept up, merely because of the infelicities of human language and the niceties of medical theories? No, we can agree upon all questions of fact and experience.

When we have considered the amendment that has been proposed by Dr. Bell, we shall be able to vote unanimously, or almost unanimously, upon Dr. Stevens' resolution.

It is universally admitted that the detention of persons in Quarantine for *observation*, as it is termed, is a farce. That practice alone creates intense and just opposition to Quarantine. Now, what are the facts respecting the results of an observance or the non-observance of personal restrictions against Yellow Fever? In New York, Philadelphia, Baltimore, and other cities, scores of travelers arrive every season from places

where the Fever is prevailing, and upon ships from infected ports—not unfrequently from vessels upon which cases of the Fever have occurred; and in not a single instance has any evil resulted from giving *free pratique* to all such persons, though they came directly from an infected cabin, and from the bedside of the sick and dying. Fifty cases of Yellow Fever were conveyed from the city of New York to the Quarantine Hospital at Staten Island, during the sickly season, in 1856; but in none of those cases was the Fever traceable to personal contagion, nor did those sick and dying victims of black-vomit, in any instance communicate the malady to those with whom they came in contact in the city; and so it has been elsewhere and at all times, except in the very midst of an epidemic of the Fever, when all reliable evidences on the question of contagion must necessarily fail.

Occasionally, persons who have attended upon such cases, have sickened of the disease. This fact cannot be disputed, as it is based upon the best authority. The cases reported by Rev. Dr. Moore, and by Dr. Joseph Bayley, on Staten Island; those reported by Dr. Hosack, on Long Island; and others reported in Louisiana and Mississippi, fully illustrate the strongest arguments of the contagionists; but none of those cases of reputed contagion can abide the simple tests of fair criticism. In other words, there are no evidences that Yellow Fever is personally communicable. But as this Convention is not called to discuss medical theories, but to determine the nature and extent of those sanitary improvements that are needed by the people and warranted by admitted medical facts, we may properly make any compromise that will satisfy theorists, and prevent opposition to the recommendations which this body may propose. Let us at least secure the freedom of all persons arriving at Quarantine not sick with the Fever. That would be an important step in reform; for even at the frosty port of Portland in Maine,

healthy persons are subject to protracted quarantine with the vessels in which they may arrive from tropical or sickly ports; and in the port of New York, steamers arriving in prime condition from Savannah, were late last September kept at Quarantine more than half a week, with and on account of passengers in health, but *presumed* to have sailed from an infected port. And that Quarantine of seventy gentlemen and ladies from the beautiful city of Savannah was necessary for the protection of our city from pestilence, while, during a previous summer, fifty cases of the Fever were conveyed from the densely crowded tenements of the city to Quarantine; many of them throwing up black-vomit previous to and while on their journey to the Quarantine Hospital at Staten Island; and yet we never heard of a single instance in which any nurse or person exposed to any of these cases, contracted the disease. Some of them came down upon the ferry-boat, standing at the rail and throwing up black-vomit. Some even walked through Broadway from 10th street, down to the South Ferry, throwing up black-vomit on the way, and yet the Yellow Fever did not spread from these persons. At that very hour when black-vomit was coming to us, at the Hospitals, upon the ferry-boats, we were detaining persons perfectly well upon vessels that were worse than infected, for the infected vessels were anchored in such numbers and in such close juxtaposition, that they created a pest-embankment—an infected locality worse than existed at Havana; and that is virtually the system that at present exists here. We have had emigrant-vessels anchored in the midst of that infected shipping, and the consequence was that by simply remaining a number of hours in accordance with the regulations of the Health Officer, cases of Yellow Fever occurred among emigrant passengers from such an exposure. That is, we perpetuate a pest-embankment, and compel the healthy passengers to remain near to it. The people of Staten Island have seen fit

virtually to prohibit and shut off from their shores a standing-place for those who might be brought from infected vessels. Under the present arrangements of the Health Officer, persons arriving from St. Jago, Havana, New Orleans, and Vera Cruz, upon infected vessels, must remain upon those vessels, or upon floating hulks.

I trust that this resolution, for these reasons, properly modified, may be passed. I believe with Dr. Francis, that we owe it to our profession, to our fellow-citizens, to make a compromise in this matter. I certainly can compromise with the venerable Dr. Francis, who knows more about the history of fevers than I pretend to; but I believe he will vote for the resolution amended, as Dr. Bell has proposed; for he cannot reasonably insist upon the recognition of the untenable hypothesis, that living human bodies may become *fomites* for conveying Yellow Fever.

Mr. PARKHURST, of New Jersey:

I merely wish to know what position the subject now occupies before the Convention. I supposed the motion to refer this subject to a Committee to report another year, or to the next Convention, was proper; and as it was seconded, that therefore it was in order. The motion to commit, I understand, takes precedence of a motion to amend. I must confess that the propositions which to-day and yesterday have been before the Convention, were to me, as a non-medical man, startling in their nature. I hold myself in all cases of that kind to be a conservative, and therefore, if this question is pressed to a vote, I shall be obliged to vote against it.

Dr. JEROME:

I rise simply to correct an impression which, from what has been previously stated here, I think must prevail in the minds

of this Convention. When it was rather playfully said by my friend Dr. Harris, the other day, in relation to the officers for the external administration of the Sanitary Police of this city, that they were imported from the rural districts, ignorant of the duties of Quarantine, I supposed it to be a mere rhetorical flourish, not having reference to the facts which had been previously cited. As it was necessary, he said, to keep facts carefully in view, I wish to state for the information of the Convention that I believe it to be the fact, that there has never been but one individual living out of the city of New York, from the rural districts, appointed to the Health Officership of this port. I believe this to be an uncontradicted fact.

Dr. HARRIS :

I wish to say that the reference I made was to the Quarantine laws. I said then, what I say now, that the Quarantine laws of New York have been usually drafted by men unacquainted with Quarantine matters ; and whatever I said had no sort of reference to his office, for he is my personal friend. I am sure I need offer no farther explanation.

Dr. JEROME :

The language was used, that it was common for the Health Officers to come from the rural districts.

Dr. STERLING .

From the position in which I have been placed, I have had an opportunity of observing the inconvenience at least, if not the disastrous consequences, resulting from the management of Quarantine located at a distance from the place to which sick persons were to be sent. Carrying out the laws of this State, that a person affected with a contagious disease shall be sent

a distance of nine miles, is fraught with danger to the individual, and frequently with loss of life. I will mention one fact: A man was sent up from the Marine Hospital as convalescent. He had the symptoms of Cholera in a febrile state. The necessary time that would have elapsed before he could be sent to Quarantine, would have been three or four hours. In consequence of that, I sent him to the nearest place; collapse ensued, and he died.

There are other topics connected with the subject to which I would like to make reference, but which do not relate precisely to the question now before the Convention. They relate to docks, and the system of Quarantine, and also to the United States taking charge of all Quarantine establishments. I have never known an instance where Yellow Fever was communicated by infected goods. I know the fact, that the Superintendent of the Marine Hospital on Staten Island, and his wife, took the Yellow Fever from clothes washed in the area of the building where they lived. I do not believe there is any such thing, as regards individual communication of the disease.

Mr. HALLIDAY:

I do hope the question will not be pressed to a vote now, as it is evident to my mind that we are not prepared to do so. I renew the motion I made, a few moments since, to lay the proposition upon the table.

JOSEPH BLUNT, of New York:

The motion made by the gentleman seems to be a very proper one. I am not prepared to vote at this time, though my opinion undoubtedly concurs with these gentlemen, that a mere individual cannot communicate the disease. I think that the public mind is not prepared for such a declaration at

this time ; and therefore I think it is more wise to refer this matter to a subsequent Convention.

Dr. STEVENS : I see that some gentlemen here suppose that the object of my resolution is to do away with Quarantine. I have no such object. I would rather make Quarantine more strict than it is now, as regards *fomites*, and I would not confound persons with things. If we can separate persons from things, and arrive at the conclusion—which I believe every practical man here, who has had any thing to do with Yellow Fever, has arrived at—that we can let persons go away from the Hospital, instead of confining them in the presence of *fomites*, liable constantly to take the disease, we shall confer a great boon upon humanity. Gentlemen talk about referring this matter to a subsequent Convention ; but this is a matter that has been under advisement for ten or twenty years, and we have the experience of men of mature age upon this subject, and I see no good reason why we should defer action upon it till a future period.

Mayor RODMAN, of Providence :

I rise to ask a question for instruction from this Convention. Some of us, who stand as the guardians of our New England cities, occupy the office of President or head of the Board of Health—at least this is the case in Rhode Island. My object in rising, is to ask the medical gentlemen composing this Convention : How shall I act in a case like this—Suppose the Superintendent of the Board of Health in our port, Dr. Snow, should report to me, as the President of the Board of Health, that there lies in our river a ship from an infected district, and he asks : Shall I let the patients on board of that vessel change their garments and come to the city ? What answer shall I give ? (Voices : Let them come.) Shall I be free from responsibility if the contagion spread over the city, and members of the

community should be taken with the disease and die? This is a very straightforward practical question, I know; but it is just this question that I should like to have answered by this Convention. While I am upon the floor, as I see Dr. Joseph Moran, a well-known citizen of Rhode Island, I would move that he be invited to take a seat as a delegate to this Convention.

Dr. MORAN was accordingly invited to take his seat as a delegate.

Mr. HALLIDAY:

I do not believe that we are well informed enough upon this matter, to vote understandingly upon it now; and I hope therefore, that it will be deferred. If we are wrong in regard to this matter, it is the fault of those gentlemen who have not educated us up to this point.

Mr. BLADEN, of Philadelphia:

As one of the laymen of this Convention—not being, of course, as familiar with the theory of Yellow Fever, and other epidemics, as the medical gentlemen who are members of this Convention—I have waited for some time to hear some remarks from the lips of those medical gentlemen who represent Philadelphia. Having been connected with the Board of Health for three years of my life, I feel some particular interest in this question, and would not like to have this proposition pressed too forcibly at this time, at least not until the medical gentlemen of this Convention have shown their hands, and by so doing, given the laymen the benefit of their experience, so that if we vote, we may vote knowingly, and when we return home to our fellow-citizens, in answer to any questions that might be put us as to the propriety and policy of our vote, point to the gentlemen of the medical profession who

represent our city, and say: It was by the advice of these gentlemen that we cast our votes.

I am not prepared fully to come to a conclusion upon this subject, from my experience based upon facts. In 1854 I had the honor of being Secretary of the Board of Health of Philadelphia, at the time when the Yellow Fever prevailed to a fearfully alarming extent in the cities of Savannah and Charleston. The Board of Health, acting under the authority of their Quarantine laws, having heard that the epidemic prevailed there to a fearful extent, directed their Lazaretto Committee, who have more particular charge of the Quarantine ground, to take into consideration such measures as they might deem necessary to prevent the introduction of the disease into the city. Within one week two steamships, the State of Georgia, and the Key-Stone State, arrived at the Quarantine ground, freighted with passengers, who were fleeing from the pestilence, which was almost decimating the population of those cities. One vessel had some three hundred and odd passengers, the other nearly four hundred. In less than two weeks we buried nearly forty passengers from those vessels. As a member of the Board, in daily intercourse with the Hospital, I was constantly in the habit of going in and out of the "Hospital." One particular case struck my attention, and awakened my sympathy and pity—that of a lady, the wife of one of the most wealthy and respectable citizens of Charleston, who was sent there with her two infant children. Her husband had been on to Philadelphia, and came to the gates of the Quarantine; but under the rule of our Board, and the laws of the State, he was prohibited from entering our Lazaretto grounds; whilst, on the contrary, the members of the Board of Health, residents of the City of Philadelphia, twelve miles away from the Quarantine ground, were permitted daily ingress and egress into this ground and the Hospitals, and then to return to their families.

These are some of the inconsistencies of Quarantine regulations, not only in Philadelphia, but in all the cities where they exist. There was not a single person, a single nurse, a single *attaché* of the Department, who had the care and attention and handling of any one of these forty persons, who was affected with Yellow Fever in any way, shape, or form. I was in the sick-room with the children of this lady. Being a father myself, I assisted the mother, who was almost worn out with fatigue, in handling and nursing the youngest child, which was quite young. My breath and face were in close contact with the child's mouth, and I saw it vomit; and yet I never took the disease. I have no personal fear of Yellow Fever; and from the facts which I have here narrated, I was satisfied that there was no danger from personal contact or communication with the disease.

Again, on the contrary side, let me relate another fact in the history of the Fever, which has come under my observation. The ship *Mandarin* was allowed, in 1853, to pass the Lazaretto, under the usual certificate given by the Lazaretto Physician and the Quarantine Master, that all on board were well and in good health. She had scarcely landed at the Lumber-street wharf, and the hatches were hardly taken off, before some of the persons, who had been working as stevedores, were taken with some disease, fatal in its character. Some died, if I remember rightly, within forty-eight hours; and within less than fifteen days, there were at least ten or a dozen persons who were affected with what the physicians of Philadelphia pronounced to be Yellow Fever; and some of these persons had no contact whatever with the ship, with any of the cargo, baggage, or freight that had come on board of that vessel; and yet they had been in communication with some of the persons who had been taken sick with the Fever, and had been in the same house with them. Here is a case where the effects produced

were contrary to that in my own case. With these conflicting facts staring me in the face, and coming within my own knowledge, I say it is not possible for me, as a layman, and as one of the representatives of the Board of Health, to give my vote upon a resolution, without I have had the benefit or expression of the experience and opinions of the medical gentlemen from Philadelphia. I have heard none of them, as yet, upon this subject.

Another reason why I am opposed to the passage of the resolution is this: That your Committee—the Chairman of which, Dr. Jewell, who, I am sorry to say, in consequence of professional engagements, is absent, has bestowed a great deal of care upon this subject—has not yet made up a full report, and has presented no propositions or resolutions to this Convention. They are not yet prepared then to give expression to their opinions; and when a subject fraught with so much interest to the community at large, has not been acted upon by the gentlemen who have bestowed such particular care and attention upon it, I think that upon a brief discussion, and upon opinions promulgated by some medical gentlemen present, whose opinions I regard very highly indeed, it would be unsafe for us laymen here to vote. If the resolution is pressed to a vote, I should be in favor of calling for a vote of the medical gentlemen of the Convention first, and then of the laymen. I therefore move, if the resolution is pressed, that the vote shall be taken in that way—that the medical gentlemen vote first, and the laymen afterwards.

Dr. MORAN:

I have never had any fear of personal contagion from Yellow Fever, and I therefore should vote in favor of the resolution.

Dr. LA ROCHE, of Philadelphia.

Mr. President: It is not my intention to inflict a very long speech upon the Convention relative to the subject

before us, and to go minutely over the ground of the contagious and non-contagious character, or of the importation and non-importation of the Yellow Fever. My respected friend, Dr. Francis, has occupied us long, agreeably and usefully—as he never fails to do on all occasions—with his reasons for adhering to the opinion that the disease is communicable from the sick to the well; that in the middle and northern latitudes it is invariably of exotic origin; that it behooves us to prevent its introduction among us through means of stringent Quarantine enactments; that such enactments have kept it off over and over again, here and elsewhere; and that the resolution under discussion would, if adopted, lead to dire results. These views Dr. Francis has long entertained. He derived them, as others have done, from his highly distinguished preceptor, the late Dr. Hosack, on whom he has passed a eulogy to which I cordially respond; and he has since found—he thinks—sufficient reason from his own personal experience in the disease, and the result of his vast reading, to adhere to them with slight, if any, modifications, and to advocate them on all suitable occasions.

I too, Mr. President, have adopted certain opinions and reached certain conclusions relative to the subject before the Convention this morning. They are the results, in some measure, of the teachings of my father, as also of one of his professional friends and countrymen, the late Dr. Mongea, and of my preceptors, all of whom had seen as much of Yellow Fever, under diversified circumstances, as any other physicians in this country, north or south. But they are principally based upon my own personal observations, and the result of a careful and critical examination of numerous publications on that disease. As to the nature of those opinions and conclusions, I need not say much; I have proclaimed them to the world on several occasions during the last thirty-five years, and more pointedly three or four years ago, in a work of large dimensions,

to which my much valued friend has so kindly alluded. Those who have honored this work or my previous publications with a perusal, do not need to be told, and for the information of such of my hearers as are not aware of the fact, I hasten to say, that on the several points under examination, my views differ essentially from those entertained by Dr. Francis. I was no believer, at the time of the publication of the work above alluded to, in the contagious character of the Yellow Fever—*i. e.*, in its transmissibility from the sick to the well. Again, so far from believing that the disease is invariably of exotic origin, I was satisfied that when it prevails epidemically in these latitudes or elsewhere, it is of local origin; I farther was convinced that the introduction of Yellow Fever, and its spread epidemically, could not be prevented by Quarantine enactments; that such enactments had never produced that effect, and that their abandonment, so far as concerns individuals laboring under the Fever, or of persons arriving in health in sickly ships, or from sickly places, would not produce the results apprehended by that gentleman, and those who think like him. Such are the views at which I had arrived at the period mentioned, and I here positively declare that I have seen, read, or heard of nothing since that time, calculated, in the most remote degree, to induce me to change the sentiments I then entertained. I am as decided a non-contagionist now as I ever was.

Since the date of that work, I have carefully perused the larger number of, if not all, the publications that have appeared on the disease, far or near—in Europe, in tropical regions, or in this country. Especially have I read and attentively analyzed all the accounts of the outbreak of the Fever, to which Dr. Francis has particularly referred. But I cannot admit that had they been put forth before the appearance of my volume, they would have exercised the neutralizing influence he is convinced might have resulted. So far from producing such an effect, I do not

hesitate to state that they would not have modified in the least degree the nature of any of the cardinal principles I have cherished, or contributed in imparting a new interpretation to the opinions I have advanced. In a word, although I have continued to study the subject of the mode of origin and propagation of the Yellow Fever, I have seen no reason to change the opinion expressed in my work relatively to it.

I no more believe, at present, than I did formerly, that the poison of Yellow Fever is produced or reproduced in the system of an individual laboring under the disease in such a way as to affect other individuals who approach or touch him. While I admit that infected vessels may and have often introduced the poison which gives rise to that Fever in places which prior to their arrival were healthy, I must refuse my assent to the belief that from such an introduction an epidemic, properly so called, is to be apprehended. So far from this, I cannot think otherwise than that the cause resides in the culprit vessel, whether originating therein, or introduced while lying in a sickly port, matters not; that on the removal of such a vessel, the disease will cease to extend, except among those who have imbibed the poison in or near her, and in whose systems it has remained in a state of incubation. At the same time, I firmly believe that individuals, sick or well, who arrive in a vessel so circumstanced, have not themselves the remotest agency in developing and locating the cause of the Fever in that vessel, and in occasioning the disease in those who sicken in the neighborhood, or elsewhere, after having been exposed to the infection in or near the vessel. In other words, I believe, that a vessel which it becomes dangerous to visit, owes the power of doing mischief not to the Yellow-Fever cases that are or have been on board, but to a poison originating in her, or received and inclosed in her hold while in a sickly port. I am willing to admit that sundry facts which have sprung up within a few years past, together with some of older date, would tend

to show that the disease may be and has been transmitted through means of clothes, beds, goods, and the like. Nevertheless, I cannot say that I am satisfied with the explanations given of these facts, inasmuch as the possibility of such a mode of transmission is opposed by innumerable other facts of an opposite character, in which mountains, as it were, of such articles, have been handled, used, washed, packed, and unpacked, without in any way affecting the health of those through whose hands they passed.

But, however this may be, admitting that the facts upon which the belief in this mode of transmission is founded are entitled to our regard, I can have no doubt that the poison by which the articles mentioned were contaminated, and through the agency of which the Fever was produced in individuals subsequently attacked, was not the product of an emanation from the bodies of the sick, but had been imbibed in localities where it originated, and in the atmosphere of which it was contained. While, therefore, I am prepared to join heartily with those who think it proper to quarantine strictly, vessels containing the Yellow-Fever atmospheric poison—whether originating therein or derived in and transported from an infected port, I care not; while I am willing to concede the propriety of preventing the immediate introduction of cargoes proceeding from sickly ships, or sickly ports; and while I am also disposed to admit, that it may be prudent to prohibit the introduction from on board of sickly vessels, from hospitals or infected houses, of clothes, beds and bedding, and the like, which have been used by persons laboring under the Fever, until they have undergone a complete purification; I have yet to discover a satisfactory reason for quarantining the sick themselves, and still less, individuals in health, who arrive among us in sickly or healthy ships, or otherwise, from infected places—persuaded as I am that such individuals are absolutely incapable of communicating the disease to those with whom they come in contact.

On those matters, and others connected with the question of the contagion or non-contagion of the Yellow Fever, and with that of the inutility of Quarantine enactments in their reference to persons affected with that disease, or who, though escaping, have been exposed to the influence of its efficient cause, I shall not enlarge in this place. Nor shall I occupy the time of the Convention with an examination of the arguments, statements, facts, and circumstances usually adduced by contagionists and importationists in support of their views. In relation to those various points, I have already sufficiently troubled the public, and especially the professional element of it. I have nothing new to say on the subject. In fact, on all that relates to the Yellow Fever, and perhaps more particularly to its mode of transmission, I have written myself dry. Especially must I refrain from offering here an elaborate answer to the remarks with which my friend, Dr. Francis, has entertained us this morning. I do so, not because he has placed the matter in such a light as to silence those who entertain views different from his own; in other words, not because he has killed the doctrine of non-contagion in its application to the Yellow Fever, but because the time of the Convention is too precious to justify my occupying a large portion of it in an attempt at such an answer. Besides, even were I disposed to undertake the task, I doubt my ability to accomplish it to my satisfaction, still less to the satisfaction of my hearers. The difficulty lies principally in the circumstance, that much of what the distinguished gentleman has said is not germane to the subject before us; that no inconsiderable portion of it consists in a depreciation of the character and merits of some of our best authorities on the subject, and whose principal cause of offense seems to consist in their advocating views different from those he cherishes; that he is lavish in eulogies of sundry writers, some of whom are now deservedly forgotten, while others whose names occasionally appear, have

uttered little more than errors in reference to the etiology of Yellow Fever, and the history of its epidemic occurrences in this and other countries; that he dwells and reasons warmly on assumed, disputed, and indeed long-refuted premises; that he continually begs the question in taking for granted the very point which he should prove, and which his opponents deny, *i.e.*, that fomites derive their hurtful influence from a poison arising from persons laboring under the disease; that he deals largely and boldly in bare assertions; that he indulges occasionally in empty declamations; and that he appeals continually to statements of more or less doubtful accuracy, derived from old and long-exploded authorities, or modern writers of little or no professional weight. The whole of this, and much of like import, he has woven together in a rambling, disjointed, and confused manner, which would put an insurmountable obstacle to my following the thread of his discourse, with sufficient accuracy and precision as to enable me to frame any thing like a brief, connected, and satisfactory answer.

Let it suffice to remark that there is scarcely a supposed instance of contagion of the disease referred to by Dr. Francis, from the famous epidemic of Grenada in 1793, related by Dr. Chisholm, down to occurrences of a period nearer our own, that I have not closely analyzed and I think refuted. They have mostly shared the same fate at the hands of other and abler investigators. Nevertheless, they are brought up over and over again by contagionists and importationists as though their correctness was placed beyond a doubt, and had never been made the subject of animadversion. What does it matter to these gentlemen that the account of the introduction of the fever into Grenada in 1793 by the Hanckey, as related by Chisholm, is shown to be a mere romance? What does it matter that the true Yellow Fever did not prevail on the Bulam coast at the time of the departure hence of that vessel—that

the said Fever did not show itself on board during the passage to Grenada—that it appears to have prevailed on shore prior to the arrival of the vessel, or at any rate that the first persons attacked had not been on board, and that the Fever broke out in the vessel *after* she had been some time in port? What does it matter to them that for more than a half-century, the physicians of Philadelphia, after a thorough examination of facts which have occurred under their own eyes, and which they ought to be supposed to understand better than individuals at a distance, have settled down—pretty much unanimously—in the conviction that the epidemics which devastated that city were not traceable to an exotic poison; that nothing of what has been written in favor of such an origin can stand the test of a critical examination, and that under no circumstances has the disease evinced a contagious character?

All this, and much more of like import, in reference to other kindred cases, makes no difference. While facts of a nature calculated to exclude completely all idea of contagion and importation are carefully ignored, the stereotyped instances of supposed contagion to which I have alluded, continue to be periodically adduced by my respected friend, and others of his party; and it would, I presume, be a waste of time to attempt to set them right on this subject. Even could we do so, we could scarcely hope to keep them so a long while. Judging from the past, we may presume they would soon glide into their old ways again, and that we should soon be referred once more to the story of the Hanckey, to the great doings of Dr. Chisholm, and to other facts of equal importance. I must content myself therefore, with simply stating that such instances furnish, in my opinion, no nutriment to the doctrine of the contagious character and of the transmissibility of the disease through the agency of the sick.

But I have wandered from the object I had in view in calling the attention of the Convention at this moment. That

object was to correct an error into which my townsman, Mr. Bladen, has fallen. This gentleman, while strongly opposing the views advocated by Dr. Francis, has referred to the account of the arrival at Philadelphia, in the summer of 1853, of the bark Mandarin, as furnishing an exception to the facts upon which he based his conclusions as to the non-communicability of the disease. Having paid particular attention to the occurrences which attended and followed the arrival of that vessel, I have no hesitation in affirming in the most positive manner, that the said vessel had no agency in introducing the disease in that city. I am not unmindful of the fact that some physicians in Philadelphia, and elsewhere, have expressed sentiments on the subject, which, if well founded, will justify the opinion entertained by Mr. Bladen. I know that importationists and contagionists abroad, and in this country, point out triumphantly to the facts recorded by one of the chroniclers of the events of the period in question, and to the influences he ascribes to the arrival of the Mandarin; that the author of a report presented shortly after to the City Council of Charleston, has no hesitation in considering this importation as "a fact too well authenticated to be disproved," and that others, without expressing an opinion on the subject, allude to the introduction of the Fever by the Mandarin, as if it were a circumstance upon which there is not and cannot be a difference of sentiment. But a careful survey of all the circumstances attending the outbreak of the Fever, in the summer of 1853, led me soon to a conclusion adverse to that here referred to. I shall not occupy the Convention with a detail of the occurrences of that visitation, and of all the facts and arguments in defense of both sides of the question. It will be sufficient for me to state some of the prominent points connected with the history of the case.

I have paid a great deal of attention to this matter, and I am

ready to state, as a positive fact, that the story of the Mandarin does not furnish any ground for the belief in the introduction of the Fever into Philadelphia, at the time mentioned, or at any rate of the communicability of the disease from one person to another. The bark arrived at the Lazaretto on the 12th of July, from Cienfuegos, Cuba; she reached the city on the 13th, and came to at South-street wharf; she remained there till the 16th, when she was transferred a little higher up, perhaps a hundred or a hundred and fifty yards. Then and not till then, her hatches were broken and the cargo was discharged. While this operation was being performed—on the 19th—the driver of a furniture car, whose standing-place was South-street wharf—nearly a whole square from the spot where the vessel was moored—was attacked with symptoms of Yellow Fever, and died in a few days. A woman serving at the bar of a tavern in that neighborhood, was taken with the disease the next day, and died; four other cases occurred the same day, and others soon followed. While these cases were occurring at a considerable distance from the vessel, and without having approached it, while they were sickening and dying, the men on board who were engaged in removing the cargo, remained perfectly free from the disease.

The captain of the vessel boarded in a tavern in the immediate vicinity, and in order to go to his meals, had to pass and repass the place where the disease occurred. He was taken sick on the 23d, but recovered. Another individual who was on board the ship was next taken sick, and died. But, as I remarked, none of those employed in unlading the vessel were affected. A short time afterwards, a few cases occurred about half a square north of where the Mandarin lay. On the 20th, seven days after her arrival, the Mandarin dropped down to the lower side of the first pier above Almond-street wharf, where she remained until the 26th. From this she was removed by the Board of Health to the cove below

the Navy Yard ; where on the 28th, she was remanded to the Lazaretto, in order to undergo a more thorough and rigid purification. Those who were employed in taking her down to Almond-street wharf, or to Quarantine, and in purifying her, remained free from the disease. Shortly after the appearance of the first case, the Fever extended in various parts of the neighborhood—north, south, and west—and continued to do so till October, during which time we had one hundred and seven'y cases.

From what precedes, we concluded in Philadelphia—at least a great many physicians who examined the subject carefully—that the bark Mandarin was not instrumental at all in producing the disease. Of the propriety of this conclusion, I have a further proof. On the 9th of July, four days *before* the arrival of the bark, an individual died after an illness of four days, at the corner of Spruce and 4th streets, which I suppose is a quarter of a mile from the place where the bark lay. He presented symptoms of an unusual and very suspicious character, and my son-in-law, Dr. Keating, who attended him, asked my opinion on the subject. My answer was, that if he did not take care, he would lose his patient, inasmuch as the symptoms appeared to be extremely like those of Yellow Fever. I did not see the patient that day, for I was residing in the country, and only came to town for a few hours every day ; but the next day, when I heard of the farther symptoms of his case, I desired particularly to see him. I walked up to the house, but learned, on arriving, that the man had just died, and died under circumstances which proved to my entire satisfaction that he had fallen a victim to Yellow Fever. He had the black-vomit and bloody stools, was jaundiced, walked about his room a few minutes before his death, shaved himself, laid upon the bed, had convulsions, and then died. This case was reported by me to the College of Physicians, and I took the proof-sheets of my paper to St. Louis at the time of

the Medical Convention there, submitted the case to Dr. Wragg, Dr. Fenner, and some other gentlemen from the South, and asked them what they thought of it. They all concurred in opinion that it was a case of Yellow Fever. I had no doubt that such was the fact. Now that case commenced on the 4th of July, and ended fatally on the 9th—while the bark Mandarin arrived on the 12th. It was ascertained that this man was in the habit, in the prosecution of his business, of walking about and remaining some time at the particular wharf where the disease broke out. This circumstance, combined with others, led me, with others, to conclude that there was poison forming there, and that the man, from being more susceptible than the other persons who were exposed, took the Fever and died before others were attacked.

All these circumstances, I repeat, lead us to believe, that the bark Mandarin had nothing to do towards introducing and spreading the Fever on the occasion mentioned.

The conclusion will appear the more natural, when we take into consideration the period of the year at which the case occurred; the high range of the thermometer at the time, and for many weeks previous; the localities the patient had visited, and the circumstance that, but a few days after, many other cases, as regards the Yellow Fever nature of which there can be no difference of opinion, showed themselves in those very same localities.

But whatever be the opinion we adopt on the subject, it will be found that by the large majority of the physicians of the city, who investigated the subject, it is admitted that the disease did not, in the whole course of its epidemic existence, manifest a contagious character. Dr. Jewell, who was the chronicler of the epidemic, and an advocate of the introduction of the disease through the instrumentality of the bark Mandarin, says that it was in no case communicated to any person visiting or engaged in attending upon the sick. Even

after the close of the epidemic, when he had ample opportunities of investigating the mode of propagation of the disease, and conferring with those well qualified to decide in matters of the kind, Dr. Jewell found no reason to believe in its contagious nature. In no instance can it be shown that the disease spread from those laboring under it. This immunity was exhibited in the various hospitals of the city. In private practice, too, although numerous cases were attended away from the infected portion of the city, we have yet to learn that the fever, in a single instance, was propagated from the sick to the well, although there was an unrestrained intercourse between the patients and their immediate friends.

Such being the case—and no physician who has inquired into the matter during the aforesaid summer and autumn, and watched the progress of the disease from place to place, and the history of the individual cases, from the outbreak to the close of the epidemic, will feel disposed to refuse his sanction to the above statement—together with the absence of any contagious element on board of the vessel during her stay at Cienfuegos, during her voyage, or at the time of her arrival; and the non-existence of any power of transmissibility of the Fever from the sick after it had broken out among us, we naturally infer that if any poison was derived from the culprit vessel, and was the means of introducing the Yellow Fever in this city, that poison was not the product of a diseased body, in other words, a contagious virus. Dr. Jewell admits this, and even if he did not do so, the inference would be natural; for a fever which, during the whole course of its epidemic career—covering a space of full three months—did not in a single instance, and under every variety of circumstances, betray the least approach to its possessing contagious properties, can scarcely be supposed to have been derived from a contagious poison proceeding from abroad, or created on ship-board—supposing the thing possible—and left among us after the departure of the vessel which had conveyed it to our port.

So much for the Fever of 1853. The succeeding year the same disease again appeared among us, and prevailed to some, though more limited, extent. The first case occurred about three squares or blocks (between two and three hundred yards) from the place where it appeared the preceding season. The patient had had no communication with any source of personal contagion or imported infection. The next case occurred in the person of a young servant-girl residing close by, in a small street parallel with, and at a short distance from, the Delaware. Like the former patient, she had not been exposed to the disease. From this time the cases multiplied and prevailed in various directions around the spot first affected. On this occasion the disease again failed to exhibit contagious properties, either in the hospitals or in private houses, whatever might be the conditions or location of these. No vessels could be pointed out by the importationists to account for the introduction of the disease; nor could the original or any subsequent case, be traced to any exotic source of infection. So glaring was this, that the importationists were obliged to resort to the assertion that the disease arose from the revivification of some germ that had remained in a latent state since the year before. How far we can admit this explanation, when we reflect that the germs must have remained dormant in places where the diseases had not existed before—for the first cases occurred in houses where the preceding year no one had sickened or died—I leave to others to decide.

To this let me add that, while in 1854 no one with the fever, and no vessel from a sickly port, or itself in an infected state, had arrived, and could have communicated it; patients the same year, but later in the season, arrived either already ill, or laboring under the premonitory symptoms, and took up their residence in various parts of the city, and whether they recovered or died, failed completely to introduce

the disease among us. The same thing occurred in 1855, during the great epidemic of Norfolk, and also in the fall of 1858.

I have but a few words more to add; Dr. Francis has touched on two points connected with Yellow Fever, which, as he seems to think, establish the contagious character of the disease. I allude to its specific nature and its distinctiveness from the bilious remittent; and to the non-liability of individuals to second attacks. I, myself, like many others, cordially unite with Dr. Francis in upholding the opinion that the Yellow Fever is a distinct form of Fever, allied to, but not identical with the bilious remittent. That a contrary view has been, and continues to be entertained in this country and elsewhere, principally by non-contagionists, is certainly true. But it is as certainly true that by large number of accurate observers, whether moving in the ranks of contagionists, or in those of their opponents, have discarded the opinion so earnestly advocated by Dr. Rush. By them, facts and arguments have been accumulated to disprove the doctrine of unity as applied to the diseases in question; and to show that, so far, its advocates have done little more beyond pointing out a fact no one has denied, namely, the existence of an affinity, or family likeness, in point of symptomatology, pathology and etiology, between the two diseases, while reasons, stronger than they have adduced, may be found to establish the independence of each of these, and their claims to be considered in the light of different and distinct complaints, and consequently to occupy a separate position in every nosological arrangement. But in adopting these views, we do not admit that they lend support to the doctrine advocated by Dr. Francis; inasmuch as it does not appear to us that because the Bilious Remittent Fever is a different disease from the Yellow Fever, and devoid of contagious properties, it necessarily follows that the latter must be endowed with

those properties. There is no reason why they may not, although distinct from each other, be both non-contagious. If it be said that the Yellow Fever being a specific disease, and that other specific febrile complaints, being contagious, the presumption is, that it is likewise communicable from the sick to the well, I will answer that it is impossible to deny that the Bilious Remittent, which is admitted on all hands to be non-contagious, is also a specific disease. Like the Yellow Fever, it is the product of a specific poison. It is produced by nothing else; while the poison which gives rise to it, gives rise to no other complaint. If therefore the Yellow Fever is held up to be contagious on the score of its being a specific complaint, I cannot see how it comes to pass that the Bilious Remittent is not also placed in the category of contagious fevers.

As regards the plea, founded on the protection afforded by an attack of Yellow Fever, I do not believe that much can be made out of it in support of the contagiousness of the disease. I may remark that the belief in regard to this power is of older date than some seem to think. It was long ago held in tropical climates, and on the continent of Europe. A century ago, Lining, of Charleston, to whom we are indebted for the first account of the Yellow Fever of this country, affirmed that "those escaped who had formerly felt its dire effects, though they walked about the town, visited the sick in all the different stadia of the disease, and attended the funerals of those who had died of it." Similar statements were made by Dr. Cathrall, as also by Dr. Kuhn, Dr. Wistar, of Philadelphia, and others of our older American writers. But let this be as it may, from this fact no argument can be derived in support of the contagious character. 1st. Because the exemption is not as complete and effectual as believed by Dr. Francis, second attacks being frequently seen everywhere. 2d. Because, some contagious or supposed contagious diseases furnish frequent examples of the same kind, a circumstance which

overturns at once the views of those who would make of this protective power an attribute of contagious disease. And 3d. Because many undeniably contagious diseases, and others of which the contagiousness, though not universally admitted, is religiously believed in, and maintained by a large class of physicians, do not secure the constitution from further attacks.

With these facts in view ; seeing that some diseases of admitted contagiousness are destitute of the power in question ; that others which usually possess it present numerous examples of re-infection ; and that others again, the contagiousness of which, though denied by some, is fully admitted by those who recognize in the Yellow Fever the possession of that property, are destitute wholly, or in great measure, of the exhausting power ; seeing all this, I say, we cannot admit the propriety of concluding, from the fact that the Yellow Fever is endowed with that power, in common with some contagious complaints, that hence it must itself be contagious.

The conclusion must appear the more inadmissible when we find that contagionists themselves—as Dr. McWilliams, whose orthodoxy on that point cannot be called in question—seem inclined to doubt the preservative power of the Yellow Fever.

On the other hand, it may be remarked, that the property of exhausting the susceptibility of the constitution is not incompatible with the non-contagiousness of the disease so possessing it ; that if the effect is admitted to be produced by some contagious morbid poisons, there can be no reason why it should be produced by other poisons, though these originate from causes of a different kind. But the erroneousness of the conclusion does not rest on such grounds alone ; for we find that other diseases whose contagiousness is not much better proven than that of Yellow Fever, have, like it, the power of exhausting the liability of attack, while others again, admitted everywhere to be non-contagious, as several forms of

malarial fever, afford, if we may credit the statements of respectable authorities, protection against re-infection.

We have here, therefore, the frequent occurrence of second attacks in diseases avowedly, or reputed to be, contagious—and, on the other hand, the destruction or diminution of the susceptibility of the system to further invasions in complaints as avowedly non-contagious. The existence of that power in Yellow Fever cannot, therefore, be viewed as militating in favor of the contagion of the disease.

With these remarks, which have extended far beyond my original intention, I close, and cheerfully and cordially approve of the resolution offered by Dr. Stevens, as amended by Dr. Bell.

Dr. STORER, of Boston:

I wish to say but a single word. This, as I understand it, is a matter which the medical gentlemen of the Convention could settle in five minutes, instead of taking two days to do it. The non-medical gentlemen of the Convention wish to vote understandingly upon this matter, and they do not ask us to settle the matter for them. Therefore I ask, if it be courteous and right to press this resolution to a vote, when they say that they are not prepared to vote? If they ask for our opinion, we give it with the greatest pleasure; but if they are not prepared to vote for ten years to come, give them that time. Truth is great, and there is no danger that it will not eventually prevail. There is no danger that the idea of the contagion of Yellow Fever communicating from one person to another will be believed. These gentlemen say that they are not prepared to give their votes now; let us therefore give them time. I never attended a meeting or convention of any kind, where I considered the subject of discussion to be of so much importance to humanity and the country, as this very question now before this body; and therefore I say to my

friends, let us do things with the greatest deliberation, and force nothing.

Dr. WOOD, of Philadelphia :

I had not prepared myself to make any observations, and I had no intention of speaking upon this occasion ; but if the gentlemen present wish an opinion, I will give it. It is simply this. In the present condition of Quarantine, it is admitted on all hands, that it is doing harm somewhere, and it is opposed by many on account of the injury it is doing. If we can find out in what that injury is, and remedy or prevent it, it is possible that we may all agree as to what would be the proper Quarantine. Now that injury is a great personal injury to a good many individuals who happen to come from infected neighborhoods, in the pursuit of their business ; for it is exposing them to the prolonged action of the poison at Quarantine, where they are kept confined with a great number of others, liable thus to take the disease, when they might otherwise escape. The ports towards which they are directed commercially, also receive great injury. If we can show that Yellow Fever is not personally communicable from one individual to another, we get rid of the whole difficulty. Persons can be allowed to go away, sick or not sick of the Fever ; but every thing that possibly communicates disease, might be retained in Quarantine. Then the great point is : Is the disease personally communicable ? If we think it is not, we should not wait year after year before deciding the question. If we can give an enlightened opinion upon this point, we ought to do it now, and then the responsibility will be thrown off ourselves. We will have done our duty, and if the country will not do theirs, the medical profession, at least, has no responsibility in the matter. An enthusiastic French physician had visited the West Indies and the United States, and had consulted every physician who had ever treated

Yellow Fever, and secured their opinions, which were published in his book, and which were almost unanimously to the point, that Yellow Fever was not personally contagious.

From my position, I have necessarily examined a great deal of evidence upon this point; and personally I have had opportunities of making investigations bearing upon this subject. In the first place, in relation to the evidence of communicability, it may be resolved into this, that the clothing, or fomites, which may be conveyed by individuals from an infected district to an uninfected district, might possibly have been the source of Yellow Fever, in the position in which they were placed; but you will observe that a healthy person may just as well convey the disease as a sick person. If therefore the disease be not communicable from persons, and if you can exclude the clothing in any way, or render it inoperative, you accomplish all that you desire. In relation to my own personal observations, I would say that I have lived through several attacks of the Yellow Fever, and have never known a single instance in which there could be a suspicion of the imparting of the disease from one person to another. We had in the Hospital at Philadelphia, fifteen or sixteen patients sick of the Yellow Fever, who were scattered all around the Hospital, without any reference to the other patients—the comparatively healthy being next to those that were sick of the Fever. Of all the patients in that Hospital, not one took the disease; and none of the physicians or nurses took it. You all know to what a terrific extent it prevailed, not long since, in Norfolk. The people of that city were scattered all over the country, and many who contracted the disease died after leaving the city; but in all these instances there has not been a case, that I have been able to ascertain, where persons who were sick of the disease after leaving Norfolk, communicated it to their neighbors. Several were brought to Philadelphia; but there was no case in which

they communicated the disease to others. I have examined this subject as fully as I have been able, and I have made up my mind that it is as impossible to communicate Yellow Fever from one person to another, as it would be to communicate Bilious Fever, though I believe Yellow Fever to be specific altogether in its character.

On motion of Dr. HARRIS, his Excellency, Governor Morgan, of New York, was invited to take a seat in this Convention.

Dr. HARRIS:

I beg leave to offer the following amendment to the resolution proposed by Dr. Stevens. I do it, because I am fully impressed with the importance of this Convention at this time, without the delay of another day, taking action upon this question, upon which the public mind is as well instructed now as it will be a hundred years hence.

Resolved, That inasmuch as the facts relating to the modes of communicating Yellow Fever in any of the Northern and Middle States, warrant the conclusion that the public health will not be jeopardized by dispensing with the quarantining of persons in health, who may have been exposed to the causes of Yellow Fever, provided that those persons are completely divested of all *fomites* of that disease," &c.

Dr. STEVENS objected to the amendment.

The PRESIDENT:

The Chair is compelled to decide that the introduction of the amendment is out of order. The motion before the Convention is upon the reference of the resolution.

Dr. GILMAN, of Baltimore:

I hope this question will not be referred. The medical gentlemen of the Convention have expressed a decided opinion,

and all the laymen desire is to be convinced that this opinion is correct. Now, our learned friend (Dr. Francis) himself, has not expressed an opinion that this was a communicable disease by individuals. The specific character of the disease has been very fully explained. Our friend across the way (Mayor Rodman) has asked a very important and decided question, upon which he wishes to base his practice hereafter, if this resolution should pass. In reply, I will mention a single circumstance which occurred with us in Baltimore, in 1855, at the time the Yellow Fever prevailed so extensively in Norfolk. You well know that our port was thrown open to the refugees from Norfolk, who came there and to northern and western cities by the hundreds—I might say by the thousands. Of the hundreds that were landed in our city, and who were taken sick with the Fever after they left Norfolk, about fifty died, and yet not a single individual of our community contracted the disease, or was in any way affected by it. If that is a fact upon which Mayor Rodman, of Providence, or any other Health Officer, can act understandingly, I do not know what he wants further.

Mr. MATHER, of New York :

I agree with the last speaker. I desire a vote upon this question instead of a reference; and I do so, sir, for this reason, that we, as a Convention, are met here to discuss matters intelligently, and with such force of argument and array of fact as to be convincing to those gentlemen who have not heretofore paid direct attention to it, either for or against the proposition. The non-professional part of this Convention have had but little to say thus far on this subject, except the proposal to delay action. I represent, so far as I am concerned, the non-professional part of the Convention. I wish to say here, as the deliberate conviction of my own mind, that I have come to the identical conclusion expressed

in the proposed resolution, with the amendment which has been accepted by the mover of it. Fourteen years ago the past winter, my attention was first called to the subject, and as matter of reflection, it has been matured to my present convictions. I have seen nothing here to-day to shake them; on the contrary, every fact elicited here, has gone to confirm me in that conclusion. Now, sir, what is one of the great objects of this Convention and similar bodies? Is it to wait till the public sentiment is aroused, and public opinion formed? And then are we to come forward, and declare as a foregone conclusion, certain facts? No, sir; I believe we meet for the purpose not only of enlightening ourselves, but of enlightening public sentiment, and taking the lead on these great questions.

Now suppose—and it is hardly a supposable case, and yet it illustrates the idea I wish to convey—suppose the disease of gout were embraced within Quarantine restrictions: would any non-professional man here be startled, if a proposition were introduced defining that particular disease as entitled to different treatment from what had been done in times past, if the facts were brought to his mind in such a way as to convince him that it was necessary to pursue that course? Would he be startled at the announcement of the proposition, as being too bold and dangerous? I think not. In regard to the practical effect of this Convention adopting that resolution, it is but an expression of the sentiment of this Convention. It does not operate as law in the ports of New York, Philadelphia, Boston, Baltimore, Providence, or elsewhere. The authorities of these particular localities are to be guided by their own convictions and investigations. Hence the honorable gentleman from Providence asked a very pertinent question, which, although a little out of place, was very proper in reference to his own guidance; yet, I apprehend, whatever be the action of the

Convention on the resolution now under discussion, he would neither exclude nor admit infected vessels, upon our action alone; but it might be a guide or hint to him for further investigations, to satisfy himself and his associates in reference to the point. I trust therefore that we shall carry out the object of this Convention, which is to anticipate and lead public sentiment. If the majority here are prepared to vote in favor of the proposition as presented, I, for one, wish the privilege of doing so.

Mayor RODMAN:

The gentleman has referred directly to the question which I proposed to the Convention. I put it in all sincerity, and I now rise with the kindest feelings which my nature knows, to submit something like a compromise to the Convention. The public mind is a singular thing. Gentlemen who have studied this question scientifically, have, by an analogical process of reasoning and their own experience, come directly to the conclusion that Yellow Fever is non-contagious. I simply say this in behalf of the laymen of this Association. If you feel that you must press this resolution to a vote, the probabilities are that it will be decided in the affirmative. I wish to ask you if it would not be well to adopt the sentiment of the distinguished South Carolinian, and exercise a little "masterly inactivity" in the present case? Your convictions are strong that this disease is non-contagious, but we, who are not educated up to that point, do not feel the conviction as strongly as yourselves. I coincide with the remarks of the venerable gentleman (Dr. Francis) who addressed us this morning, when he exhorted us to exercise caution in voting on this resolution.

Why would it not be well to pass a resolution something like this: "That we, the medical portion of this Convention, are fully convinced in our own minds that there is no fear of

personal contagion in the case of Yellow Fever?" While they expressed this as their own views, they would not at the same time be understood throughout the United States as saying that it would be well for the cities to adopt their resolution in all its fullness. Should a resolution of this kind be adopted, the medical men will be perfectly satisfied, while the laymen will not be expected to vote upon the question.

W. L. BLADEN, of Philadelphia:

I am as ready at this time to vote for this question as any of the medical gentlemen, when I am sustained by such opinions as those of Dr. La Roche and Professor Wood of Philadelphia. In my opinion, Yellow Fever is not contagious, and this opinion is based upon a knowledge of certain facts which have come within my own experience. I am ready to vote for the resolution as amended, and I trust that the yeas and nays will be called, and the medical gentlemen will vote first.

Dr. SNOW:

The question asked by the Mayor of Providence would lead some to suppose that my mind is not made up on the subject. I would say to the Convention that it has always been my practice, when a vessel arrives supposed to be infected, to allow well persons to leave twenty-four hours after arrival, requiring them to remain long enough to change their clothing, and get properly cleansed. I should consider it a relic of barbarism to keep them on board a vessel, for in no case do I believe that Yellow Fever is ever contagious in the sense that that term is generally used.

Dr. MILLER:

I desire to say a few words in relation to the arrival of ships, as statements have been made of what has been done in other cities; and perhaps I may answer the question pro-

pounded by the Mayor of Providence. About eight or nine months ago, the steamer Illinois arrived from the city of Havana, laden with passengers, and having Yellow Fever on board. Now the practice of the Health Officer at Quarantine was to detain the vessel and passengers. In consequence of the detention at Quarantine, the owners of vessels appealed to the Commissioners of Health, which Board consisted of seven individuals; they appealed to them for a change of direction which detained the passengers at Quarantine; the passengers were in commotion, and a riot was threatened. Wealthy people from Havana were on board, who said to the Quarantine authorities: "You propose to put us in contact with pestilence, small-pox, and yellow fever; why, we are healthy." The question was discussed before the Commissioners of Health, and the resolution which they passed, giving permission to the passengers, after ventilating their baggage, to come to the city, may be found upon their books. The Secretary of our Convention, I believe, was a member of the Board of Health at the time, and no doubt remembers the fact. The vessel was detained at Quarantine and sent to the lower bay. Since I found that the doctrine of Dr. Vaché—who has been Health Officer himself—was true, that the detention of passengers at Quarantine in a healthy state was an absurdity, I have advocated the course which the Board of Health pursued in the case to which I have alluded. When I stated this doctrine, together with other facts, to the Board of Health, they passed a resolution to excuse healthy passengers from remaining at Quarantine. I do not know whether Dr. Harris has personal knowledge of the fact or not, that passengers arriving from Havana and New Orleans were not detained, but allowed to proceed to the city. When the people heard of a case of Yellow Fever, of course they became greatly excited, and it was necessary to have the patient removed immediately, although there was no more danger from it, than

from gout or rheumatism. It was not known that three persons died in my neighborhood of Yellow Fever, for if it had been publicly known, I would have been obliged to have had the parties removed at once, in order to keep the people quiet, for you might as well attempt to stem the torrent of Niagara, as to pacify the people when such a rumor is started. One good reason why we should pass this resolution is, that the public may be put in possession of the facts and know the true state of the case. I do not theorize, I give you facts. The Health Officer of Brooklyn, who sits here, will tell you that every case that was taken out of that infected neighborhood, was carried into the Flushing Hospital, and there was not a single instance where the infection spread. Those persons employed in the Quarantine establishment will tell you that while there have been multitudes detained at Quarantine, not a solitary case occurred among the nurses or any of the attendants, except those who were in contact with an infected cargo, or the substance taken out of the holds.

Such are the reasons I present you, to show why I am convinced that this resolution should be passed at this time. The passage of the resolution by this respectable Convention will give a cast to public opinion, and will also materially contribute to allay the anxiety that has prevailed in the community. Commerce has suffered very much from an erroneous opinion that has prevailed here when any cases of Yellow Fever occurred.

The previous question—being the reference of the resolution—was demanded, seconded, and ordered.

The PRESIDENT stated that the vote would be taken (as enjoined by the order of the Convention) by Societies, each Society represented upon the floor having one vote; but on motion of Dr. McNULTY, it was

Resolved, That the vote be taken by yeas and nays, each member of the Convention giving one vote.

The question was then taken upon the reference of the resolution to a Committee, and decided as follows: Yeas, 11; nays, 61.

Dr. McNULTY then moved the adoption of the original resolution of Dr. Stevens, as amended, which, at the request of the President, was read by the Secretary, as follows:

Resolved, That in the absence of any evidence establishing the conclusion that Yellow Fever has ever been conveyed by one person to another, it is the opinion of this Convention that the personal quarantine of cases of Yellow Fever may be safely abolished, provided that *fomites* of every kind be rigidly restricted.

The resolution was then carried, by a vote of 70 yeas to 4 nays. (For the yeas and nays on the final vote, see the proceedings of Saturday.)

Dr. KEMP, of Baltimore:

In behalf of a minority of the original Committee appointed to prepare a report on the Quarantine question, and to whom it was recommitted in order to append definite propositions upon which the Convention could act, I submit the following resolutions for consideration:

Resolved, That the operations of Quarantine should not be confined to the warm months of the year; inasmuch as a vessel arriving in mid-winter with Small-pox or Typhus on board, is as legitimate a subject for Quarantine as one arriving in mid-summer.

Resolved, That the adoption, by the commercial nations, of a sound and well-digested code of marine hygiene, and of the necessary measures for insuring its strict enforcement, would tend greatly to alleviate the evils of the present system of Quarantine, and promote the comfort of passengers and crew.

On motion, the above resolutions were adopted.

Dr. REID, of Edinburgh:

Having communicated, Mr. President, with five or six different governments in respect to this point, and being extremely gratified that the subject to which your attention is now being directed, is under discussion, will you permit me to detain you but for a moment to refer to the fact, that it is very probable that a great deal of assistance might be obtained in its settlement before the Convention takes final action upon it, if a Committee were appointed to examine into the subject, and to take such steps as might be deemed advisable to promote the great object of uniting the different nations in the one great subject of Quarantine, so that the action at the port of arrival and at the port of embarkation shall be identical, and brought into harmony with the existing arrangements on board of the ships themselves? Without saying a word further, I move, if agreeable to this meeting, the following additional resolution to those just adopted:

Resolved, That this Convention appoint a Committee to consider and report in what manner the foregoing resolution (of Dr. Kemp) may be most effectually carried out

It was adopted.

Dr. REID:

Allow me to add a single word: There is a ship in process of construction in this city, the Russian frigate "General Admiral," which contains a larger system of ventilation, so far as I am aware, than any other vessel in the world. I have the authority of Mr. WEBB, and the Russian officers, to show the plan to any gentleman who may desire to see it.

Dr. KEMP, of Baltimore:

I now move the adoption of the Report on Quarantine as far as it has been read; and as authorized by that Commit-

tee, I am prepared to offer some alterations in its phraseology. If members will turn to page 55 of that Report, they will find the following paragraph:

“Every system of Quarantine which fails in the accomplishment of the only legitimate object of its institution, can be viewed in no other light than as a grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea that it is necessary as a prudent preventive measure. From an inefficient or a badly and imperfectly administered Quarantine, no possible good can result. It is simply an arbitrary curtailment of the freedom of intercourse and of trade, without any equivalent good to justify its infliction.” I move to strike out this paragraph and substitute this instead: “There can be no hesitation in admitting, that with very judicious and well-administered preventive measures, a large share of the benefit alluded to can be obtained; at the same time it will scarcely be denied that every system of Quarantine which fails in the accomplishment of this, its only legitimate object, may probably be viewed as a grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea, that it is necessary as a prudent preventive measure. From an injudicious and imperfectly administered Quarantine, few substantial advantages can result. It is too often but little more than an arbitrary curtailment of the freedom of intercourse and of trade.” It struck some of us, who talked this matter over, that the substitution of this paragraph for the objectionable one on the 55th page, would meet the views of all the members of the Convention.

It is proposed to strike out these words in the next sentence: “While, however, the Committee would denounce as worse than useless, every system of Quarantine,” &c., and substitute the following words: “While, therefore, we may be convinced of the propriety of the policy of adopting pre-

ventive measures, founded upon a correct appreciation of the mode in which vessels arriving in a port may become the means of inducing disease of a more or less malignant character, and which are at the same time administered and enforced with judgment as well as strictness, we must be prepared to denounce as worse than useless, every system of Quarantine which, either from the incorrectness of the principles on which it is founded, or from the careless and inefficient manner in which it is executed, is inadequate to guard the community against the introduction of disease from abroad."

Dr. BALDWIN, of New Jersey :

I second the amendments presented by Dr. Kemp. I would state, Mr. President, in making my objections yesterday, I had no real objection to the general sentiment and tenor of the Report; but I stated that it evidently contained certain matters which would impress every reader with the idea that the person writing it was opposed to all Quarantines, and in that view of the subject, I objected to its adoption as a whole. There have been some remarks made here as to the propriety of adopting this Report; and I think it is proper where gentlemen embody certain facts and principles in a Report without attaching resolutions thereto, that the sense of the meeting can be heard either for or against them, that the objectionable features should be stricken out before the Report should be adopted as a whole. The tenor of the amendments is correct, and ought to be the expression of this Convention; otherwise, we would go out to the world as an anti-Quarantine Convention. It is proper and right that these objectionable features should be removed from the Report, as they contain ideas that are adverse to the fair and right understanding of the whole subject-matter.

The question was then taken on the amendments, and they were agreed to.

Dr. JEROME:

Before this Report is adopted as amended, I would state that there are other portions of it equally objectionable with those that have been stricken out or amended. I would refer the Convention to page 48: "Should we then have recourse to Quarantine regulations for the protection of our coasts? *We think not.* Quarantine, in a country so dependent for its prosperity upon its foreign trade, is, in our opinion, a greater evil than the Cholera itself," &c.

On motion of Dr. McNULTY,

The Report as amended, was then adopted. (See Appendix A.)

On motion, Dr. Edward C. Munday, Health Officer of the town of Castleton, Staten Island, was invited to take a seat in the Convention.

Dr. STEVENS, of New York, offered the subjoined resolution:

Resolved, That a Committee of — be appointed to report, at the next meeting of this Convention, specific recommendations of principles and measures of Quarantine, as severally applicable to Yellow Fever, Cholera, Typhus Fever, and Small-Pox, having reference also to the variations which different localities require.

Dr. BELL:

I think that all the purposes of Dr. Stevens' resolution are covered by Dr. Reid's motion, which is to recommend a code of regulations for the government of Quarantine and nautical affairs everywhere.

The resolution was referred to the Committee to be appointed under the resolution of Dr. Reid.

A rule was adopted limiting the speakers to five minutes each, until the close of the session.

The PRESIDENT called General WETMORE to the Chair.

Dr. CLARK, of Boston, called up the Report of the Committee on the Internal Hygiene of Cities. The Report was read section by section, and several sections of the draft appended to the Report, entitled "Draft of an Act for establishing General and Local Boards of Health, and for Sanitary Purposes," were, with slight modifications, adopted.

The question then occurred upon the draft of the Sanitary Code for Cities.

The preamble and first section being adopted without discussion, the question occurred upon the second section, which reads as follows :

"The duty of executing and enforcing the provisions of this 'Code,' is hereby invested in the Board of Mayor and Aldermen (or, in towns, in the Board of Selectmen, or such other persons as shall be chosen by the legal votes of said towns or districts), and they are hereby constituted the Local Board of Health, with all the powers and privileges usually invested in Boards of Health, and with such further special powers as may be conferred by the provisions of this ordinance."

Dr. GRISCOM :

The section just read admits the principle which I stated last evening, and which the Convention adopted as an amendment to the second proposition in the act already passed. The principle, I think, should always be adopted, that a Board of Health, which has the supreme executive and administrative power in matters pertaining to sanitary improvement, should be in possession, in some degree at least, of scientific knowledge. Now, it is well known that Mayors and Aldermen are not generally in possession of that knowledge. In this country they are almost uniformly selected for their

political abilities and capacities, without reference to their scientific attainments. I am not desirous that upon all occasions the Board of Health—as in the case of the city of Baltimore—should be composed wholly of medical men; but there always should be a strong infusion of that element in the constitution of the Board. On that account, I am dissatisfied with the form of the second proposition. There ought to be a provision of law, requiring the element of medical knowledge in the Board. In Paris and in London, the matter is fully understood. In Paris every *arrondissement* has its local Board of sanitary officers, composed of nine persons, two of whom are physicians; one of them is required to be a veterinary surgeon and another a pharmacist. Thus we see the scientific elements are represented in such a Board. We ought not to lose sight of the advantages to be obtained by such a construction of a Board of Health; and I trust that the gentlemen who have drawn up this Code, will be able to change the phraseology in such a way that the defect be covered.

Dr. CLARK :

I think the suggestion is very good, and will be happy to make the amendment suggested. I propose to introduce after the words, "Is hereby invested in the Board of Mayor and Aldermen, and they are hereby constituted the Local Board of Health," "One third of which shall consist of medical men."

Dr. REID :

If you consider the work to be performed by a Board of Health, some of it requires not only medical knowledge, but a knowledge of architecture and agriculture. I would therefore beg leave to suggest whether it would not be better to say, "One architect, one agriculturist, and one engineer shall be joined with the medical men," in order to give complete assistance on all professional points.

Dr. CLARK :

I beg leave to call Dr. Reid's attention to the 68th section, which provides for the appointment of a surveyor.

Dr. LA ROCHE :

I perfectly agree with Dr. Griscom as to the necessity of a strong infusion of the medical element into the Board of Health, as many of the subjects pertain particularly to medical men. I have suggested to the Philadelphia Board that the majority of it should be medical men.

PRESIDENT *pro tem.* :

It is proposed to insert the words, "A majority of whom shall be Doctors of Medicine."

Dr. GRISCOM :

I favor the suggestion of Dr. Reid. I think there ought to be embraced in this Board, individuals pertaining to various branches of science, engineering, architecture, &c. But it seems to me that the Board of Health will be sufficiently well informed in these matters, if it has the medical element in it, because the medical element takes general cognizance of all the other branches of science which should be embraced in the action of a Board of Health, while, I perceive, the matters which are enumerated in the 58th section—the appointment of sub-officers—embraces all these elements.

Mr. HALLIDAY :

While I agree most fully with the gentlemen who have spoken, still I think we should regard policy somewhat in deciding this question. In asking for too much, we may get nothing. We have had some little experience in this matter, and I am sure that if the medical element is introduced into the Board of Health, they will keep the balance straight. I

offer an amendment to the amendment submitted by Dr. Clark, namely, that instead of a majority of the Board being medical men, "one third shall be medical men."

Dr. GRISCOM:

We should not trespass too far upon public prejudice in this matter. A determination by the Convention to recommend a majority of medical men, might look invidious, and I do not know that it would avail after all; for members of the Board of Health will be guided more or less by medical opinions; and under those circumstances it would be better not to have a majority of physicians in the Board of Health.

The second section, as amended by Dr. Clark, was adopted.

The third proposition was read and adopted.

The fourth section was referred to a Select Committee, consisting of Dr. Clark and Mr. Viele, to incorporate slight amendments that were proposed and adopted.

The remainder of the sections were then read, and after a few unimportant alterations, the Code was adopted. (See Appendix E.)

Dr. GRISCOM:

I take great pleasure in moving a vote of thanks to the able gentleman who has prepared this Report, and in so doing, would express my deep sense of obligation to him for having presented to the Convention a code of sanitary laws, which, if carried into effect, will vastly improve the condition of the people. I therefore propose the following resolution:

Resolved, That the thanks of this Convention are especially due, and are hereby cordially tendered to Dr. H. G. Clark, of Boston, for the able report prepared by him of a Code of State and Municipal Sanitary Law—believing that the same,

if generally adopted in the United States, would tend greatly to the improvement and preservation of the health of the people.

Dr. HARRIS seconded the motion, and it was unanimously agreed to by the Convention.

Dr. CLARK, of Boston :

I rise simply to express my sincere acknowledgments to the Convention, for the kind manner in which they have received the Report prepared by myself, and to express my regrets that the subject could not have been intrusted to better and abler hands. This Draft of a Code is a compilation, and not a composition, and I felt quite at liberty to incorporate into it any material which appeared to be suited for the purpose. I adopted the English Public Health Act as a model. Various sections, with such alterations as were required, have been extracted from it, and therefore as its compiler, rather than its author, I have had no wish but that it should be so modified and amended before its adoption, as to meet entirely the views of the Convention.

Dr. KEMP called up the report of Dr. W. C. Van Bibber on "Disinfectants" (Appendix B); the report of Dr. Griscom on "Water Supply and Sewerage" (Appendix C); and the report of Dr. John Bell, on the "Importance and Economy of Sanitary Measures to Cities" (Appendix C). These reports were adopted, and ordered to be printed in the proceedings, and a vote of thanks was unanimously tendered to these gentlemen for their labors.

A vote of thanks was then tendered to the authors of the Report on Quarantine

PRESIDENT *pro tem.* :

It is distinctly understood, and the Secretary will be so instructed by the Chair, that in announcing the Report on

Quarantine as a part of the published proceedings of this Convention, the Convention itself, and the members thereof, are not to be held responsible, as sanctioning either the principles or expressions contained in these reports, any further than they have acted definitively upon them.

Dr. HARRIS, Chairman of the Committee on Business, made the following report:

Whereas, The sanitary and economical interests of cities and large towns are directly, and in a very important manner, affected by the quality and condition of the various articles of food, and facilities for supplying the same; and, *whereas*, there are various other agencies and conditions incident to civic life, which exert a direct and important influence upon the public and personal hygiene, and which, in our opinion, fall within the scope and functions of municipal and State legislation and control; therefore

Resolved, That we recommend to the Convention that committees be appointed, to investigate and report upon each of the following subjects, at the next Sanitary and Quarantine Convention:

First—A Committee of three members, to report upon Food, its qualities and conditions in cities and large towns, and the facilities requisite for supplying the same, together with plans and suggestions for proper arrangements for butcheries, markets, and abattoirs.

Second—A Committee of six members on Civic Cleanliness, with plans for the disposition of offal, refuse street cleanings, and night soil of cities.

Third—A Committee of three members, to report upon legal restrictions for the control of the sale of poisons and dangerous drugs.

Fourth—A Committee of three members, to report upon

Architectural Improvements, with reference to personal and public hygiene.

Dr. McNULTY moved that the reported be adopted.

Dr. STEVENS, of New York:

I object to this report. The ground covered by that resolution more properly belongs to the "American Medical Association," and it derives no force, no weight, from a Conventional Assembly. It contains matters which it is necessary to deal with in the particular locality, but which do not admit of useful generalization. We are wasting our time and labor in considering such matters, when we have more appropriate duties in relation to Quarantine, which must of necessity take a great deal of time to consider.

Dr. GRISCOM :

I regret to be obliged to dissent from the views of the gentleman who has just taken his seat. This is not solely a Quarantine Convention ; I hail nothing with more joy, during my brief experience in sanitary matters, than to see a Convention assemble from the various quarters of the United States, that will take into consideration, and urge upon the people, the necessity of an improvement in their internal and personal sanitary affairs, independent of Quarantine regulations. In the remarks which I had the honor to make upon taking the Chair, which you, Mr. Vice-President, now occupy temporarily, I expressed myself very briefly and hastily upon that subject, to the effect that the internal domiciliary and civic relations of affairs to sanitary matters, were vastly more important, than those relating to external disease. We cannot discuss this question too much or too profoundly ; the people must be informed on this matter, *ab initio* ; and there is no other way I know of, by which they can be brought before the people and thrust upon their attention, except through a

popular Convention of this kind. The National Medical Association confines its labors and its expositions to medical matters alone. They do not take up the question of general sanitary affairs as broadly as they should do, in connection with food, architecture, &c. ; and I, for one, trust that this resolution will be adopted, and committees appointed to discuss this question.

Dr. STEVENS :

We have a Sanitary Association in this City, and why should we ask gentlemen from Charleston, Savannah, and other cities, to tell us how our houses should be built?

Dr. HARRIS :

The object of this resolution is not to reach the interests of New York more than those of other cities ; and in framing the resolution, there has been rather a studious regard not to trench upon a strictly medical question, or any technical question that would be likely to excite a medical discussion. We have stricken out all such questions, except that relating to drugs. If Dr. Stevens will read the resolution, I think he will see that it will not have a tendency to awaken medical discussion.

Dr. STEVENS :

I would ask what you will leave the Sanitary Association to do, if you put every thing which they ought to attend to, into the hands of this Convention?

Dr. HARRIS :

The design of the resolution is to call forth reports upon particular topics, with reference to the civic interests that are concerned in this Convention. Municipal authorities often need special advice upon a particular subject, such, for in-

stances, as the subject of markets, slaughter-houses, &c. I believe that in this city, our municipal government would hardly find at its command suitable authorities upon those particular subjects.

But a report issuing from this Convention——

A DELEGATE :

Why not let the Sanitary Association take up this matter ?

Dr. HARRIS :

I hope it will, in time, but I believe this subject of butcheries and markets is so intimately connected with the hygiene of cities, that it is well worthy of the consideration of the Convention. Again, the sale of poisonous drugs is an important subject. I know that we have in this Convention more than one gentleman ready to enter upon a special discussion of that subject, with reference to its jurisprudential bearings. But the design of the resolution is not to take up the medical bearings of any question, but to call up practical reports.

Mr. VIELE, of New York :

I agree entirely with Dr. Griscom, in his remarks, when taking his seat as President of the Convention. Although the time of the Convention has been devoted almost wholly to Quarantine, yet it is, in fact, but a secondary matter. I agree with the language of one of the reports, which says, that the most stringent Quarantine regulations would be utterly useless, unless our interior arrangements were made perfect with regard to maintaining the health of the city. One paragraph in the Report submitted to the Convention, referring to the city of London, is applicable to every large city in the United States ; and now is the time, when so many of our towns and cities are increasing so rapidly in population, to lay down proper preventive measures for their sanitary government

before it is too late, so that the people shall not be put to the expense of removing the evils which must otherwise increase in the future to a very alarming extent. The report on "Sewerage" quotes the following language from the work on Hygiene, by Dr. Pickford, which, although written for London, will answer equally well for New York, Philadelphia, or any other large and crowded city :

"In all large cities and towns there are plague-spots, where Fever of the intermittent, remittent, or continued form, always prevails in greater or less intensity. There are districts and localities in our modern Babylon which are ever remitting the poison which generates Typhus Fever; there are certain squares and streets, nay, particular houses, the inmates of which, family after family, for a long series of years, have been the victims of Typhus Fever, though the districts in which they are situated are airy and the soil dry. * * *

"There is probably no subject so complex, so incalculably difficult to grapple with, especially if it be how to apply a remedy, as the drainage and sewerage of large overgrown cities. Yet, we must perceive, that unless this be efficiently done, *an ultimate limit is set by the hand of man to himself, to dynasties, to peoples, and to nations.*"

It is well known to my colleagues, that I stand upon this floor simply by reason of my special occupation as an Engineer. I came at their request, and I feel I would not be doing my duty unless I impressed by a few feeble words of my own upon the members of this Convention, the importance of looking more closely to the drainage of their respective districts and cities. We are suffering in the city of New York more than other people are, because we have proceeded more recklessly than they have, and I venture to say, if twenty-five years ago such an association as this National Sanitary Convention had been in existence, and had taken up this subject of drainage and made it known in its fullest extent, that we would not

now be subjected to the great evils under which we are suffering. Perhaps the city of New Orleans may be yet free from Yellow Fever; perhaps all our cities of the sea-board may be exempted from the periodical returns of the epidemics which are depopulating them. The report is eloquent throughout with facts bearing upon the question as to the best mode of warding off those diseases from our large cities; and it would be doing an injury to ourselves and the cause we have so deeply at heart, if we should stop here and merely take the question whether Yellow Fever is contagious or not. If we undertake to legislate on sanitary matters, let us cover the whole ground.

The report of the Business Committee was then agreed to.

Mr. VIELE, of New York, offered the following resolution, which was adopted:

Whereas, The proper carrying out of a system of drainage and sewerage in all incorporated cities is of necessity in the hands of the properly constituted authorities, and as a consequence under the control of private citizens; therefore

Resolved, as the sense of this Convention, That the responsibility of all diseases and deaths caused by imperfect drainage or defective sewerage rests upon the corporate authorities of cities, and it is earnestly recommended to the authorities of cities to thoroughly investigate and provide prompt remedies for the evils arising out of these causes.

The PRESIDENT *pro tem.* (Mr. WETMORE), laid before the Convention the following resolutions, transmitted to the Secretary by Dr. JEWELL, of Philadelphia:

Resolved, That the President and Secretary of this Convention, with one member from each State represented here, be a Committee to lay before the "Smithsonian Institution" and Congress, the comprehensive reports that have been adopted

on. "External and Internal Hygiene," in order to secure their influence and approval, and thereby obtain for them the widest circulation through the commercial and inland cities of the United States.

Resolved, That in the event of the above object having been secured, said Committee be instructed to prepare a circular or an address setting forth the advantages of State medicine to each State separately, and its several municipal corporations as well as the cities at large, urging upon them to secure by legislative enactments, laws, and regulations, founded upon such scientific principles as shall best promote the physical welfare of the people, and that it further recommend the appointment of a standing committee for each State, whose duty it shall be to institute an accurate sanitary survey of the State, its counties, its towns, and its localities, to ascertain the causes which favorably or unfavorably affect the health of its inhabitants.

Dr. HARRIS:

I gladly second the resolutions. The last one embodies principles that must soon be recognized by all enlightened States. The vast importance of the subject presented by that resolution is being illustrated in all civilized countries, and painfully has it been illustrated in the State of New York.

The resolution contemplates a thorough and scientific investigation and a practical elucidation of the facts and principles that should guide our legislative and executive officers, in all matters relating to the external and the internal sanitary defenses required by cities, towns, and states. Although, for one, I am happy to believe that the time may not be far distant when sanitary science, and a general attention to personal and public hygiene, will have reached such a point that we may safely dispense with all Quarantine restrictions, for the ship upon

the sea, and the cargoes from the tropics will, ere long, cease from being the carriers of pestilential miasmata, when the truths of sanitary science are properly understood and appreciated, it has already been made manifest in the course of the discussions in this Convention, that the principles which should guide in the establishment of the laws and practices of our *external* sanitary or Quarantine system, are not as definitely understood as are those facts and principles that more directly apply to civic and personal hygiene.

Mark the difficulties and uncertainties confessed by the learned Committee, who have so honestly and so ably reported to this Convention on the subject of Quarantine. Peculiar difficulties, and questions the most complex, environ the subject of Quarantine or external sanitary laws. Looking at the great objects to be attained, the vexed questions to be settled, and the national, international, and world-wide interests concerned in the proper adjustment of external sanitary arrangements for commercial towns, it has appeared to me that a *national commission* is demanded by the exigencies of the times, to investigate and report upon the subject of Quarantine, and the great fundamental questions of State Medicine that underlie all rational sanitary regulations.

But whether we have a national and international commission or not, it is manifest that the interests of every State call for such special, scientific, and local labors, as those proposed by this resolution.

A distinguished writer on State Jurisprudence, asserts that "Medical polity is a *necessity* for every State;" and the great Plato gave to the physician a prominent place among the counselors of state in his ideal republic.

The true mission of the physician will be properly recognized when medical commissioners are appointed in our several States. Massachusetts nobly took the lead in this work nearly ten years since, and we do not detract any thing from the credit

due to the noble and learned delegates who represent the old Bay State on this floor, when we utter the opinion that the labors of that commission, composed of Messrs. Shattuck, Banks, and Abbott, have been carried forward by those honored delegates, and that they now culminate in the most complete Sanitary Code even yet prepared—the Code prepared by the chief officer of public hygiene in Boston, and which this Convention has adopted.

I move the adoption of Dr. Jewell's resolution, believing that when carried into effect in the various States of our Union, it will be productive of results at once full of blessings to the people, and abounding with rich scientific fruits.

The resolutions were adopted.

The PRESIDENT (Dr. Griscom) here resumed the chair. On motion, Dr. Snow, of Rhode Island, was requested to continue his investigations on the subject of Registration, and to report at the next annual Convention.

HENRY O'REILLY, of New York, moved that five copies of the proceedings of the Convention, when printed, be furnished to each Delegate. The motion was agreed to.

Mr. WETMORE:

I will state for the information of the gentleman, that I am informed from competent authority that it is the desire of the city authorities to assume the expense of publishing the proceedings of this Convention. I would therefore move that the proceedings of this Convention be published under the auspices and direction of the city authorities of New York.

The motion was agreed to.

Resolutions of thanks to the corporate authorities and the College of Physicians and Surgeons, for the courtesies and accommodations extended to the Convention, were passed.

The Convention then adjourned till to-morrow at 9 o'clock A.M.

FOURTH DAY—SATURDAY.

THE Convention met pursuant to adjournment, and was called to order by the President. The minutes of last evening's session were read and approved.

Mr. WETMORE said :

There is a subject connected with the transactions of yesterday, which I desire to bring before the Convention, and I do it at the request of eminent gentlemen, who took part in those proceedings. The resolution adopted by this Convention on the important subject of Quarantine has attracted, and will continue to attract, public attention in an eminent degree at home and abroad. It is desirable that the public should know—especially that part of the public who take an interest in these proceedings—who were the men that made up that great majority of seventy against four. The weight of authority, as well as the weight of numbers, must be given to this subject. I therefore move—perhaps it might not be deemed necessary to move, because our proceedings are open to the world, and any person is at liberty to take a note of what is passing here, and to print it ; but, as an act of courtesy properly due to the Convention, I move—that the Secretary be instructed to publish the names which make up the division on the Quarantine vote.

Dr. MILLER :

Is that particularly in reference to the resolution of Dr. Stevens ?

Mr. WETMORE

Yes, sir.

Dr. HARRIS:

I have no personal objection to the resolution, but I think the gentlemen who might not wish to have their names recorded, may not be on the floor at this time.

Mr. WETMORE:

Then they ought not to have voted.

Dr. HARRIS:

It seems to me that the question upon which we voted yesterday, may be misapprehended by many persons who are not familiar with the literature and science of medicine; and even some persons who are familiar with medical history will persist in their adherence to preconceived theoretical opinions respecting the means by which diseases are propagated. The vote which we have taken on the question of *personal quarantine* for Yellow Fever, is the expression of our convictions from *experience*, not from speculations.

Dr. Stevens' resolution, as passed, is very strong and decided in its language—more decided than some gentlemen were willing fully to indorse at the moment the vote was called. I believe if the vote were to be taken again, and *Dr. Francis were to omit his speech*, and were the hall as full as it was yesterday morning, there would not be a negative voice. I believe so from the fact that there is no essential difference of opinion on the subject, in the medical profession. Even the good Dr. Francis would not dissent from the main facts involved in that resolution; and it might place some of those gentlemen who voted in the negative in a wrong light before the public, if their names were published, as they would then be made to appear, *volens volens*, as advocates of the doctrine of personal contagion of Yellow Fever—a doctrine that has no other basis than that derived from the hypothesis and the deductions from analogy.

As practical men, the great majority of more than seventy

members of this Convention have boldly declared their opinion that Yellow Fever is never known to be personally contagious, and that its propagating cause is incapable of reproduction or of generation within, or by, the human body. It is not strange that the venerable Dr. Francis, with the reminiscences of fifty years' warfare against the doctrine of the domestic origin of the Fever in northern ports, should tenaciously adhere to the hypothetical opinion of the possible or *contingent personal* communicability of the disease. But practically, Dr. Francis admits and believes, that the Fever is not communicable from person to person, in a tolerably pure atmosphere. Practically and as a matter of fact, Dr. Francis agrees with us. I am opposed therefore to a public registration of the ayes and nays. That is a deeply interesting question which we considered and voted upon yesterday, the most practically important of any question that has ever been decided by any of the Quarantine Conventions hitherto convened on either continent, but our votes do not settle the moot questions of medical theorists. We must not boast too much of our prowess.

Mr. WETMORE:

I do not believe in the beneficial action of any Convention that meets to discuss and not to act. Whenever important action is had, it ought to be announced to the world: we meet in the open light of day, and whatever we do here is published. It is a source of regret to me that I was taken out of the Convention to perform a portion of its duties in the committee-room, and thus was prevented recording my vote in the affirmative; but that cannot be helped now. If gentlemen were present and voted in the negative, and desire not to have those votes recorded and published, they should, in their place, have exercised the privilege which every member has, of changing his vote to the affirmative; but we cannot afford to lose the great advantage of that affirmative vote,

for the purpose of rescuing four members of the Convention from an error into which they have fallen with their eyes and ears open. We must have this vote published to the world as early as possible, that it may be seed growing into a harvest, and bringing forth fruit before long. I desire that every man's vote shall be published, with the State whence he came, and I make that motion accordingly.

Mr. HALLIDAY :

I do not regret that I was one of those in the glorious minority. My impressions were not at all changed by the very interesting and eloquent address of Dr. Francis. I may say rather that they were confirmed. I am just as confident this moment, of the premature action of this Convention, as I was at the time the vote was taken. I think the vote was correct, as I said yesterday. I do not doubt the soundness of the conclusion to which the medical portion of the Convention arrived in regard to this matter ; it would be folly in me to attempt to controvert it ; But I do think that the action of the Convention on the proposition was premature, in thrusting the subject upon a community that was not prepared to receive the doctrine, by a previous training or course of preparation. I shall be very glad to have my name recorded with the minority.

Mr. MATHER :

I hope the President will confine the discussion to the original proposition.

Dr. McNULTY :

I wanted that vote taken that it might be expressive, so that every man might vote understandingly, knowing that he was committed. I want the record to stand as long as time shall endure, and I desire to have my name recorded to a vote in favor of a resolution which declares that patients may come

from a Yellow-Fever ship, and after being properly purified, may come and go anywhere with perfect safety.

The PRESIDENT

If the Chair may be allowed to make an observation on this subject, he would state, that in his opinion the proposition is rendered almost unnecessary by the fact that the vote was so nearly unanimous, and is so expressed in the papers of the day, which have carried the information to the four quarters of the globe: the vote was *seventy to four*—an almost unanimous expression of the sentiments of this Convention. But there is another consideration which induces me to hesitate before giving my assent to this proposition, and that is, the special deference which, at all times and under all circumstances, I would pay to the gentleman who has been called, upon this floor, the father of the medical profession in the city of New York. He was the only one, if I mistake not, among the members of the medical profession, who voted in the negative. His reasons, as I understood him, for voting in the negative were, not so much that he disbelieved in the pertinency and propriety of that resolution, but only in its expediency at the present moment. I believe that Dr. Francis is not opposed in reality to the sentiments of the resolution, but he is only opposed to the propriety of its present promulgation; and without his being present here, and assenting, it would be indelicate to force his name before the public at the present moment.

Dr. McNULTY:

I do insist, as far as my opinion is concerned, that Dr. Francis is no more to be protected here because he has committed an error, than the name of Dr. Stevens, or any other physician. I hope that this motion to have the names published, will be adopted, and that it may go forth to the world that

Dr. La Roche, Professor Wood, and a host of other distinguished men, voted for this resolution.

Mr. MATHER moved an amendment to the proposition, that the names of the gentlemen in the affirmative alone be printed, which was not entertained. He then moved that the gentlemen who were absent on Committee business when the vote was taken, might have the privilege of voting, which motion was adopted.

Mr. MATHER then proposed the subjoined resolution.

Resolved, That a Committee of eight be appointed by the President to inquire and report as to the organization and practical working of the Dispensaries in the cities of this and other countries, and as to their relation to municipal and domiciliary hygiene.

Adopted.

Dr. HARRIS moved that two additional members be placed upon the Committee on Food, Markets, and Butcheries. He said he made that motion because it was desirable that there should be a division of labor, and thorough work in that Committee. The resolution was seconded and adopted.

Dr. BELL, of Brooklyn, offered the following resolution:

Resolved, That a Committee of three be appointed, whose duty it shall be to inoculate the cow, and supply the members of this Convention annually, with a supply of vaccine matter thus obtained.

A brief discussion ensued upon the resolution, in which Drs. Bell, Snow, and Storer took part. The President deemed the subject foreign to the objects which the Convention had met to promote, and therefore the resolution was withdrawn.

On motion of Mayor LINCOLN, of Boston, the Convention unanimously determined to hold their next annual session in that city, on the Thursday preceding the 17th of June.

Dr. JOHNSON moved the reconsideration of General MATHER's resolution, in reference to dispensaries.

Carried.

The SECRETARY suggested that it was usual to appoint an Executive Committee to make the necessary arrangements for the next Convention, which was subsequently done.

Dr. HARRIS moved that a Committee of three be appointed to report upon the nature and sources of miasmatic exhalations that are properly subject to state or municipal control, or legislative attention. He moved that resolution, because he knew there were members of the Convention who have given particular attention to that subject, both as regards rural districts and large cities; and also because it was a matter that would never be considered in a strictly medical or scientific association.

The President here called General WETMORE to the Chair.

Dr. DARBY, of Mobile.

Mr. President—I would say there are infinite sources of malaria; it occurs everywhere. You can get it in your streets or anywhere, but that is not the question. The question is as to its effect upon health. There may be a malaria and it not produce disease, and there may be malaria in those places which are apparently healthy, and which may produce disease. There may be malaria upon the sea-shore, which would be fatal if a person were to lie upon the shore at night, and there may not be malaria in places of a most unpleasant odor: for odors that come from decaying substances, have no more to do, in many cases, with malaria, than the waters that fall from heaven.

We can separate every thing that has odor or taste, or any other visible property, and still find the malaria. This point has led to mistakes in the investigations on the subject. The investigations of Dr. SMITH, of England, so far as I have seen, of his publications in this field, are liable to great errors. As far as I know of his propositions, there is no dependence to be placed upon them; they are liable to the most serious ob-

jections. For example, in his experiments in London, he says there are twenty things that may vitiate the atmosphere, while malaria or organic matter may not be there. This test of organic matter is entirely fallacious, as we have proved in thousands of cases. We have found that in the sandiest places, and even in ploughed land, we can find the very same thing in the ridges or in the furrows of ploughed fields, that we find in the streets of New Orleans.

When I visited New Orleans last fall, after the subsidence of the Yellow Fever, I detected malaria on the tops of the houses; there was still more in the middle stories, while there was a great abundance in the bottom: but after a second frost and a heavy wind, it disappeared entirely. It is a common opinion with the planters, that it is improper to allow a cotton-field to come up to a dwelling-house; they have found when the cotton-field does come up to the dwelling-house, they have typhus fevers in the fall season. The reason is obvious, and we have detected it. Cotton has a root which goes straight down into the earth; the roots are more efficient as an agent for destroying malaria than the leaves of the plants. It is a common thing in the southern country, for planters to cut down their trees to keep the surface perfectly clear; and from this clean surface I have obtained organic matter when there was no appearance of any thing of the kind, and those persons would be sick from this cause. Between the roots and the leaves this malarious influence is found. If the report had come up in its proper form the other day, I would have spoken with regard to some principles in it; but as I did not, I throw out these remarks to show what the direction this investigation of malaria should take.

The question was then taken on Dr. Harris's resolution, and it was agreed to.

Mayor LINCOLN, of Boston:

I suppose it is universally admitted that the success of every

deliberative body must be in a great measure owing to its presiding officer, and I rise at this point to present a resolution. I think we have been very fortunate this session, and I have heard members who have been present, remark that this has been the most successful Convention of the three. I think we have been peculiarly fortunate in the character of our presiding officer. He is well known in the city of New York, and in all our cities, on the sea-board and in the interior, as a gentleman particularly interested in sanitary matters; and he has proved in his position, as presiding officer, prompt, efficient, and able. I therefore propose the following resolution:

Resolved, That the thanks of this Convention be presented to Dr. John H. Griscom, for the courteous and able manner in which he has discharged the duties of President of this Convention.

The resolution was adopted unanimously.

Mr. WETMORE, President *pro tem.* :

I have the honor, Mr. President, to inform you that this Convention have unanimously voted to you its thanks for the manner in which you have discharged your public duties in the chair.

Dr. GRISCOM rose in his place on the floor, and replied as follows:

It is with no ordinary feelings of satisfaction, that one so inexperienced as I am in the duties of the Chair, should have received this mark of approbation from my fellows. For the first time in my life have I been called upon to preside over such a deliberative assembly, and I can assure you that I take this mark of the approbation of the Convention, not as an unmeaning compliment. I feel that this expression of their thanks means all that it says. It affords me pleasure to think that I had the good fortune—for good fortune it must be—to have given you satisfaction. I accept this expression

of your thanks with the most hearty feelings, and with my best wishes that the Convention may never be worse served, and that they may always be better served. I shall take further occasion to express, before we adjourn, my views upon this and other matters.

Dr. HARRIS :

It is possible that some of the gentlemen who have been named on committees, may be unable or unwilling to serve. I therefore move that the Chairman of each Committee have power to fill such vacancies as come to his knowledge after the adjournment of the present Convention

The suggestion was adopted.

The President resumed the chair.

Mr. MATHER moved a vote of thanks to the Secretary, for the able and efficient manner in which he has discharged his duties.

Mr. HASWELL, Secretary, replied by saying that he was very much indebted to the Convention for the expression of their approval of his labors. It afforded him much pleasure to render any service to the Convention

Dr. BELL moved a vote of thanks to General Wetmore, for the able manner in which he discharged the duties of Temporary Chairman, which being announced to him, he said :

Mr. President, I feel profoundly sensible of the honor done me by the vote which has been passed. It was wholly unnecessary, and wholly undeserved on my part. I have endeavored, by every thing in my power, to forward the success of this great movement. That it has done good, I firmly believe ; that much more good will result from its action hereafter, I believe as firmly. I hold that every man who has had his name recorded in the books of this Convention, has enlisted in a crusade against a gigantic and growing evil. The

time has come when this evil must be combated energetically and perseveringly, and no man who puts his hand to the work must ever turn back; victory is to follow this movement. It may be months and years, and tens of years, but no man will ever regret the time or the vote that he has given to such an enterprise as this.

Mayor LINCOLN moved a vote of thanks to the Common Council of the city of New York for their sumptuous entertainment at the Metropolitan Hotel, which was carried unanimously.

Mr. MATHER moved a vote of thanks to the representatives of the press for their attention and courtesies to the Convention, to which Dr. Frank Tuthill, of the *New York Times*, briefly responded.

Dr. WATSON, of New York, then rose and said:

Standing as the representative of the principal medical body in this city, I take great pleasure in being present. I must say that I concur heartily with the general principle of Dr. Stevens' resolution. I believe that Yellow Fever in our climate is not a contagious disease. I cannot, however, speak of any other place than New York. It has not been my privilege to see many cases of Yellow Fever, and yet for the last twenty-five years, I have seen a considerable number of sporadic cases, that have been brought into our public institutions. I have seen straggling cases in the wards of our Hospital, but not in private practice. No attempts have been made to seclude patients under those circumstances, further than to give them fresh air, and I do not know of a single case that has ever spread from patients in that institution. So far as that is concerned, therefore, I am perfectly willing to record my vote in favor of the general principles of the proposition of Dr. Stevens, which I am asked to sanction by recording my vote at this time, not being present when the

question was taken. But there is one shadow that comes over my mind, and it is this: The public at large, perhaps, may not be sufficiently able to draw the distinction between a contagious and an infectious disease, and they may at once infer from the proposition as it is drawn up, that inasmuch as Yellow Fever is not a contagious disease, therefore Quarantines are no longer useful. This inference I would wish to put a veto against, for I believe in Quarantines. And further, people will not understand the word *fomites*. The idea intended to be conveyed by that word should be put in such language that nobody shall mistake it. I think it is proper that something should be said to put people on their guard against the inference to which I have alluded. I do not know that it is necessary to use many words; but I believe it is generally admitted that *fomites* may be the means of communicating Yellow Fever from one place to another. I think that can be laid down as a general proposition, and is understood by all medical men. What do we mean by *fomites*? We mean by *fomites*, those materials—whether they are inorganic, animal, or vegetable—by which the morbid agent, or virus, is carried from one place to another. I believe it is generally admitted in the medical profession, that goods, bundles of hair, woolen clothing, cotton bales, and other substances, may act as *fomites* for the spread of this disease.

Mr. MATHER rose to a point of order. He hoped that the question would not be opened again for discussion.

Dr. STEVENS :

I am quite sure that Dr. Watson's sentiments and mine are the same, and I hope he will be permitted to continue his remarks. I call upon him as a man of candor to vote in the affirmative on the resolution.

The PRESIDENT decided Dr. Watson to be in order, in giving the reasons for his vote.

Dr. WATSON continued :

I was just saying that the human system itself may act as other *fomites*, in communicating the disease, and on that account we should be very careful to use the word in such a way that we will be clearly understood ; and on that account I restrain my vote. I believe the human system may act as *fomites* as well as a bundle of goods. *Fomites* come from an infected district, overcharged with its atmosphere, and when the atmosphere of that district is in the system, it enters into the blood and the secretions, and it may take days and weeks for the patient to get rid of it. And although one man coming from such a district, might not communicate the disease, if a ship-load came, they might do it. I think there should be some qualification of the word *fomites*.

Dr. STEVENS :

It is not a mere vote of triumph I desire, if I may so express myself, in this Convention ; for I want every member of this body to go away convinced that he has voted understandingly. My friend, Dr. Watson, talks about *fomites* in the human system, and he reasons himself into the conclusion that it may carry Yellow Fever. That is reasoning against facts, and where we have facts to appeal to, we have no right to reason except from them. It is only in the absence of facts that we are obliged to found our opinions upon reasoning. When we have facts, they are the only proper foundation to rest upon. If we had never seen a case of Yellow Fever, as with Cholera when we were expecting it here, then should we have a right to reason, and trust to authorities ; but when we have the facts before us, and have never seen it conveyed by persons, we have a right to conclude that what has been, will be, and it has never been conveyed by persons before ; and that is a firm platform to stand upon, firmer than Dr. Watson's.

Dr. WATSON :

What has been may be again, and what has not been, yet may be. We know very well, sir, that there are good observers in the United States, as good as there are in this assembly—educated physicians, and as good philosophers as any here, who believe firmly that Yellow Fever is communicable. Dr. Dickson, formerly of Charleston, told me, within the last two years, that he believes it as firmly as that he lives, and that he was getting proofs of it every year. I speak on the authority of good men and good writers, for I am not ignorant of this matter.

Dr. Watson was requested to record his vote, and he voted in the affirmative after making the above explanation.

Several delegates who were absent yesterday, having also entered their votes, the final record of the vote on the resolution of Dr. Stevens thereupon stood as follows :

AFFIRMATIVE—85.

The President (J. H. GRISCOM, M.D.), of New York.

A. H. Stevens, M.D., N.Y.,	John Watson, M.D., N.Y.,
E. Harris, M.D., N.Y.,	J. McNulty, M.D., N.Y.,
Stephen Smith, M.D., N.Y.	W. C. Anderson, M.D., N.Y.,
D. B. Reid, M.D., N.Y.,	J. W. Sterling, M.D., N.Y.,
A. S. Jones, M.D., N.Y.,	S. S. Purple, M.D., N.Y.,
Jas. S. Cooper, M. D., N.Y.,	Joel Foster, M.D., N.Y.,
S. T. Hubbard, M.D., N.Y.,	James O. Pond, M.D., N.Y.,
H. D. Bulkley, M.D., N.Y.,	F. U. Johnston, M.D., N.Y.,
A. Underhill, M.D., N.Y.,	T. C. Finnel, M.D., N.Y.,
W. Rockwell, M.D., N.Y.,	E. Lee Jones, M.D., N.Y.,
J. Miller, M.D., N.Y.,	Samuel Boyd, M.D., N.Y.,
W. H. Williams, M.D., N.Y.	J. H. Jerome, M.D., N.Y.,
H. Guernsey, M.D., N.Y.,	W. R. Donaghe, M.D., N.Y.,
J. R. Wood, M.D., N.Y.,	A. N. Bell, M.D., N.Y.,
F. Tuthill, M.D., N.Y.,	J. C. Hutchinson, M.D., N.Y.,

AFFIRMATIVE—Continued.

J. P. Batchelder, M.D., N.Y.,	J. F. Wilson, M.D., Del.,
G. B. Wood, M.D., Penn.,	G. W. Cowdery, M.D., Va.,
R. La Roche, M.D., Penn.,	W. M. Wilson, M.D., Va.,
J. F. Lamb, M.D., Penn.,	John Darby, M.D., Ala.,
L. W. Buffington, M.D., Penn.,	C. F. Force, M.D., D. C.,
W. A. Piper, M.D., Penn.,	E. M. Snow, M.D., R. I.,
H. G. Clark, M.D., Mass.,	J. Mauran, M.D., R. I.,
J. Moriarty, M.D., Mass.,	F. Peckham, M.D., R. I.,
D. H. Storer, M.D., Mass.,	G. Grant, M.D., N. J.,
J. A. Nichols, M.D., N. J.,	J. A. Cross, M.D., N. J.,
M. Baldwin, M.D., N. J.,	E. T. Wittingham, M.D., N.J.,
S. H. Southard, M.D., N.J.,	J. M. Cornelison, M.D., N. J.,
J. P. Trimble, M.D., N. J.,	C. F. J. Lehlback, M.D., N.J.,
H. D. Holt, M.D., N. J.,	W. L. Bladen, Penn.,
C. B. Guthrie, M.D., Tenn.,	J. H. Hendren, Va.,
W. M. Kemp, M.D., Md.,	Conway Whittle, Va.,
D. J. McKew, M.D., Md.	W. McPhail, Md.,
J. Gilman, M.D., D. C.,	Hon. F. W. Lincoln, Jr., Mass.,
J. F. Callan, D. C.,	S. D. Craven, Mass.,
F. E. Mather, N. Y.,	Geo. A. Curtis, Mass.,
Chas. H. Haswell, N. Y.,	Jos. S. Bailey, Mass.,
P. M. Wetmore, N. Y.,	T. C. Amory, Jr., Mass.,
C. C. Savage, N. Y.,	Silas Pierce, Mass.,
H. O'Reilly, N. Y.,	George Dennett, Mass.,
Wm. Nelson, N. Y.,	Eben Atkins, Mass.,
Jos. Blunt, N. Y.,	Clement Willis, Mass.,
Hon. D. S. Gregory, N. J.,	Hon. M. Bigelow, N. J.

NEGATIVE—6.

J. W. Francis, M.D., N. Y.,	E. P. Nichols, M.D., N. J.,
H. N. Parkhurst, N. J.,	S. B. Halliday, N. Y.,
Thos. H. Town, Penn.,	W. H. Taylor, Penn.

Mr. WETMORE :

I rise now, Mr. President, to submit a double proposition : First, that when this Convention adjourns, it will adjourn to meet in the city of Boston, on the Thursday preceding the 17th of June, in the next year ; and, secondly, that the Convention do now adjourn.

The question having been put, the President, before announcing the vote of adjournment, addressed the Convention as follows :

GENTLEMEN—

Delegates to the Quarantine and Sanitary Convention :

The cords which have bound us for the past four days so closely and kindly together, are about to be severed ; in many instances the eyes which have during that time looked so earnestly into each other, may not be again therein reflected on this side of the grave. But we separate not as they who have met on the field of battle, in contention for the mastery, by shedding each other's blood ; not even do we part as do they whose selfish ends are sought by mutual deception, and political manœuvres ; but having been brought together at no little personal sacrifice, for higher aims and holier purposes, even the saving of life, and the advancement of the health, happiness, morals, and prosperity of our common humanity, you have the proud satisfaction of the blessing which attends good works.

If you had accomplished nothing more, the labors of yesterday will remain an enduring memorial of your intelligence, and your devotion to the highest interests of humanity.

The act of the morning was a great step in advance of the sentiments and judgment which have overshadowed the medical and public mind, from time immemorial, on the subject of

the personal communicability of Yellow Fever. With one bold stroke, you have swept away prejudices and doubts, which have heretofore marred the discussions of societies, disturbed the harmony of learned colleges, and raised angry passions in the breasts of all concerned, whether as subjects of quarantine, or otherwise. For the first time in the history of this great subject, as far as I am aware, has a decision been arrived at by so large and intelligent a body. So far as the almost unanimous voice of this Convention can do it, it has settled a vexed question of ages.

Nor was the second great item of yesterday's labors, of less significance or importance. You adopted an idea, heretofore unknown on this side the Atlantic, a *systematic code of sanitary laws, applicable to all places*.

In that code you have concentrated the wisdom and the experience of men who have devoted years to the examination and study of the subject. Probably no two things could more forcibly have demonstrated the value of such assemblages, and in my small judgment their continuation, annually, is demanded by the highest interests of the people, and it is hoped that their organization will ere long be fully systematized and regulated, according to some fixed rules of representation.

To have been privileged to preside over a deliberative assembly that has wrought out two such grand results, will ever be esteemed the highest gratification of my professional life.

But, fellow-delegates, whatever we may have done for the advancement of the objects which have brought us together, we should be derelict of duty did we allow our individual labors to cease to-day. Whatever general principles of sanitary law you may have enunciated for the consideration of our successors, or for the legislation of states and communities, you have but just put foot upon the border of a vast field of

sanitary science which lies before you to be explored and cultivated.

In the brief and hasty extemporaneous remarks which I made upon assuming the chair, with which you have honored me, I incidentally remarked that the two branches of the subject which has occupied your time and thoughts, viz., *External Quarantine and Internal Protection*, against disease, are widely different in their importance to the welfare of the people; though I feel constrained emphatically to assert, that in their relative importance, "the order of their going" is diametrically opposite to that which they hold in popular apprehension.

Almost from the time of the first settlements of the colonists in this western world, defenses against the approaches of disease and death from other places, have been the thought and care of every city, town, and hamlet, while they have little dreamed that with their increase of population, and their compaction, they have in every instance multiplied the sources of disease and death within their own precincts; nay, within their very households.

This sad truth has come to be fully realized in its full weight, only in very recent days, and even yet in comparatively few instances, while it is as demonstrable as any proposition in Euclid, that in almost any city that can be named upon this hemisphere, the relative danger of the sickness and death of any given number of the inhabitants, from external sources on the one hand, and internal civic and domiciliary causes on the other, is about as *one to one hundred*.

To satisfy one's self of the truth of this statement, it is only necessary to glance, on the one side, at the *names* of those diseases, which, generated in the midst of a populous city, like this for example, are preventable to a greater or less extent, and on the other side, at the list of diseases against which, from abroad, Quarantines are maintained for our protection.

In the catalogue of the first class are included the following :

Cholera,	Infantile Convulsions,
Cholera Infantum,	Erysipelas,
Hydrocephalus,	Scarlatina,
Cholera Morbus,	Measles,
Dysentery,	Small Pox,
Diarrhoea,	Typhus, and some other forms of fever.

Twelve certainly, and did time permit a critical examination, probably the number might be increased.

Having looked upon that side of the picture, let us glance at the other; and here I shall speak by your authority. In the minutes of the proceedings of the Quarantine and Sanitary Convention held in Philadelphia, in 1857, it is stated as their conclusion, that the diseases "which may be introduced into a community by foul vessels and their cargoes, and diseased crews and passengers," are Small Pox, and "under certain circumstances, Typhus, Cholera, and Yellow Fever;" *four in all*.

But of these four, we find three in the preceding list, viz., Cholera, Small Pox, and Typhus, leaving but one as exclusively a foe against which the barriers of Quarantine are to be kept continually in readiness.

And is not the recital of these two classes of diseases, though by their names and numbers only, a demonstration of the idea, that the internal sanitary affairs of a city, or a state, demand at least an equal consideration with the external?

But we have abundant further demonstration of the vast difference in the importance of these two branches of the subject.

Enter for a moment into the labyrinth of the statistics of mortality of this city—this commercial metropolis, with its boasted enterprise, its wealth, its intelligence, its shrewdness.

It has had within twenty-seven years five serious attacks of epidemic cholera, which carried off 12,300 persons; and in these instances, though the Convention has enumerated it among those which may be introduced by foul vessels from abroad, all quarantine was useless: in fact, it entered our country, in the first place, through northern portals. But no sanitarian will doubt, that had this city been prepared against its visitations by proper sanitary regulations, that mortality might have been greatly reduced.

Again, Cholera Infantum is a disease almost wholly confined to cities, and is in a great degree avoidable—and yet we have lost by it in twenty-five years 15,000.

So by those other two infantile disorders which have been named, we have lost in twenty years no less than 32,400; and yet these are diseases intimately dependent upon the domiciliary condition of the families in which they occur.

But when we come to consider Small-Pox, how do we stand? Here is a disease which all know to be almost totally preventable, at least capable of being completely disarmed of its terrors; and yet, within fifty years, New York has experienced the loss of at least 10,000 of its inhabitants by that loathsome disorder. Within a few years we have lost *annually* from 400 to 600. Nor is this all. The mortality from small-pox is estimated to be from five to ten per cent. of the cases; so that, at the lowest of these figures, it must have left its ravaging marks upon not less than 50,000 other individuals.

And how has it been with the only remaining disease for which the enormous burdens of Quarantine have to be maintained? As stated before, all the deaths by Yellow Fever which have occurred in this city, in Brooklyn, and at the Quarantine station combined, within the past fifty years, amount to only 600; the same, in round numbers, as we have been accustomed of late, to lose annually by Small-Pox alone.

Gentlemen, I need occupy not a moment longer in endeavors

to convince you of the superior necessity of attention to the internal sanitary regulation of cities.

An equal serious question, however, is as to the method by which the needed improvements shall be brought about in any specific place. Wise legislation must of course be obtained; but how, and through whose interference, is this difficult subject to be put right on the statute-book?

Permit me to express the opinion, that there is but one ground-work upon which the desired superstructure of law can be certainly and securely based. I mean the education of the people on the subject, and its continual agitation. As a thorough believer in sound republican democracy (in its technical sense), I hold that no amendments in this, as on other subjects, can be satisfactory or safe, without instructions to the legislators, from an instructed people. The masses being those who alone are interested in questions of public health, it is they who must first be moved to demand reform, and their servants, the legislature, will—*they must*—then grant it.

And from whom are the public to receive the necessary enlightenment, to justify them in demanding the proper measures of self-protection? Clearly the initiative steps for this purpose must be taken by the members of the medical profession; but their labors, when once begun, will not be long unshared by laymen. It is a subject which the medical members of the New York Sanitary Association well know, touches deeply the hearts as well as the intellects of other citizens; and this Convention felt the truth of this fact, while drinking in the eloquence which, during our session, fell from the lips of one of those who told you how and why he has been moved to devote his time and talents to it. And there are very many others among us, who, though they have not gratified us here by the sound of their voices, yet give their hearts, hands, and purses to the work; and so, gentlemen, I believe it will be found, in any place, of whatever size.

Look for once at the glorious results obtained through the influence of the "Health of Towns Associations" in Great Britain. Independently of London, we are continually receiving accounts of the most substantial improvements in the sanitary condition of her cities and boroughs, improvements effected through the associated efforts of professional, and laymen.

And contrast London, the metropolis of England, with New York, the metropolis of the United States. In 1665, so degraded, filthy, and polluted was the condition of its population, then about as numerous as that of New York now, there died nearly 100,000; 68,000 of which mortality, was from the Plague—a proportion of more than one in ten of the entire population. Its mortality is now one in forty-five—and its sanitary condition is represented as a fraction better than that of all England. Fifty years ago the mortality of New York was better than that of London now, being one in forty-six and a half—while statistics show it to be now one in twenty-seven.

Should the Cholera, or the Plague or Yellow Fever, now visit this City, it would find us ready, as was London two centuries ago, to receive and nourish it—and next year we should richly deserve to be visited, as was London in 1666, by that great sanitary reformer—*conflagration*!

But, gentlemen, I weary you, and will but, in conclusion, re-urge upon you the recommendation to start at once, on your return to your homes, the formation of sanitary associations. Collect around you some of the wealth, the intellect, and the benevolence of your respective localities; recite to them the sanitary facts which you may have discovered; and if our experience is any criterion, you will soon be abundantly compensated.

Let the land be covered with Sanitary Associations, and it will soon stand as much a landmark for the health, happiness, and comfort of its people, as it is now a beacon-light for the politically oppressed of other lands.

In conclusion, fellow-citizens and associate delegates, let me utter again my cordial appreciation of the unmerited honors which you have heaped upon me; and hoping that all the deficiencies I have exhibited as your presiding officer, will be attributed to their just cause, a want of experience, I now bid you farewell, and declare the third American Quarantine and Sanitary Convention adjourned, to the time and place appointed.

The Convention then separated.

REPORT
OF THE
COMMITTEE ON QUARANTINE.

REPORT.

THE Committee to whom was referred, at the last Quarantine Convention, held in Baltimore, April 29th, 1858, the accompanying resolution—

“*Resolved*, That the following subjects be referred to a committee, to investigate and report upon them at the next meeting of the Convention, to wit:

I. A HISTORY OF QUARANTINE.

II. HAVE QUARANTINES SECURED THE OBJECT FOR WHICH THEY WERE ORIGINALLY INTENDED? IF NOT, THE REASONS OF THEIR FAILURE.

III. WHAT REFORMS ARE REQUIRED TO MAKE QUARANTINES MORE EFFICIENT AND LESS BURDENSOME?

IV. IS A UNIFORM SYSTEM OF QUARANTINE LAWS FEASIBLE? OF SO, TO PROPOSE A PLAN BY WHICH THE OBJECT MAY BE ACCOMPLISHED.

V. A CONSIDERATION OF THE BEST MEANS FOR PURIFYING AN INFECTED VESSEL.”—

Beg leave to present the following report:

The subjects embraced in the resolution submitted to its consideration are confessedly of the highest importance in all their relations—social, commercial, and scientific. They

affect the interests equally of the body politic and of each individual citizen. They are, at the same time, encompassed with difficulties which render their correct solution a matter of no little embarrassment. Their magnitude and importance will be found to augment at every step in the investigation, while the limited and unconnected nature of the data upon which it has to depend for its guide in their elucidation, are calculated to increase the difficulty of arriving at a correct and speedy solution of them.

In entering upon its labors, the Committee cannot do better than introduce the sentiment that gave origin to the resolution under which it acts, as a full explanation of the object of its appointment :

“If Quarantine is to hold a place, and have a name, in the list of useful institutions of the age ; if it is to continue to maintain the supposed character it has for several centuries enjoyed, as the only safe preventive system for the preservation of public health from the introduction of diseases from abroad, there must be, as a necessary result, far more time, talent, learning, and thorough investigation given to it, than it has ever been favored with.

“The interests and claims of society, and the ceaseless improvements in the science of medicine, are sufficient arguments for urging upon the friends of reform the importance of a more accurate investigation of the laws governing Quarantine, together with those intricate, vexed, and still unsettled principles which have a direct bearing and a controlling influence upon the subject.”

From this it will be perceived that a thorough and accurate investigation of the subject of Quarantine is expected of the Committee. While it will be its endeavor to furnish as full and definite a report as the scanty materials within its reach, and the limited time at the disposal of its members, will permit, it must not be forgotten that the entire proposition is one

that heretofore has received far less attention, and been less fully subjected to a strict logical investigation, than almost any other within the wide domain of medical science. If, therefore, its work should be imperfectly performed, the Committee trusts that some points not entirely devoid of interest will be clearly presented in its report, and others so far elucidated as to induce a more thorough inquiry in respect to them, based upon more extended researches, and a more careful series of exact observations, that may ultimately result in the settlement of questions essentially connected with the prosperity of commerce and of international intercourse, and with the promotion of the best interests of humanity.

Adhering to the order in which the subjects are arranged, in the resolution before the Committee, the first which claims its attention is ·

I. A HISTORY OF QUARANTINE.

The question of Quarantine and that of contagion are intimately associated. The first had its origin in, while all its requirements are framed upon, the truth of the doctrine which assumes the existence of a contagious miasm or emanation as a means through which disease may be propagated. So soon as it was recognized that such miasm or emanation was capable of being transmitted from place to place by diseased persons or by fomites, the necessity of Quarantine to protect the community from the serious consequences of such transmission was necessarily suggested. The means of protection attempted to be embodied in the first crude and imperfect systems of Quarantine, and the erroneous manner in which these were carried into practice, not only rendered them unavailing as a protection from the introduction of disease, but caused them often to become in themselves agents of positive mischief.

So long as the contagious character was attributed solely to diseases, the transmission of which from the sick to the well, or by fomites, is clearly demonstrable, and the provisions of quarantine were restricted to the keeping out of a community those who are actually affected with such diseases, together with such clothing and other materials capable of serving as fomites, the question remained a very simple one, and with enlightened views of the claims of humanity and of the principles of hygiene, its provisions could have been rendered easy of enforcement and effectual in their results. The propriety, at least, of Quarantine regulations could not be denied, whatever disputes might arise as to their details and the best method for their enforcement. But when the question of a contingent contagion began to be mooted, when diseases originating in causes of an atmospheric or telluric origin, were supposed, under certain conditions, to be capable of transmission by a contagion that had become developed in them; when the foul air that may be contained in the hold of a recently arrived vessel was entirely overlooked as a source of infection to those exposed to its influence, and only one mode by which disease could be introduced from without, namely, a contagion emanating from the bodies of the sick, or from fomites, was acknowledged—the entire subject of Quarantine became involved in confusion and the utmost uncertainty; and from the erroneous principles upon which it was based, and the absurd plan upon which it was attempted to be carried into execution, all the good it was adapted to accomplish was effectually counteracted. In all cases it became an unnecessary burden upon commerce, and a vexatious interference with the freedom of intercourse, while in some cases it proved itself a source even of disease.

The questions soon arose, Is Quarantine necessary under any circumstances? Can it become, under any condition of things, a certain means for the exclusion of disease? Is not

its enforcement attended always with more evil than good results?

The discussion to which the subject of Quarantine has heretofore given rise, has furnished only a cumbrous mass of evidence capable of shedding but little light upon it.

The history of pestilence is the history of Quarantine. As the origin of the former is enveloped in mystery, and lost in the darkness of remote antiquity, so the precise period when a quarantine in its rudimentary form was instituted, is veiled in doubt and obscurity. Both alike may be traced to the earliest ages. That they existed far back in the world's history, prior to the Christian era, and before the existence of any freedom of intercourse between nations by means of commerce, sacred and profane history furnish the clearest evidence.

Moses, the Jewish legislator, was not only familiar with contagion, but he inculcated sanitary precepts and instituted quarantine regulations. In the 13th chapter of Leviticus, we find the most stringent precautionary measures directed to be carried out by the children of Israel, with a view to prevent the spread of disease, by separating the sick from those in health. He there not only gives orders for the lepers to be set apart from the rest of the people, but requires that their clothes shall be purified, and even that the garments belonging to the more aggravated cases should be burned. In the 14th chapter, he gives explicit directions for the purification of the persons of those who have been cured of the disease, and also determines the time that the diseased shall dwell alone without the camp, as well as without their tent, after being permitted to enter the camp (8th and 9th verses). In the account of the journey of the Israelites from Egypt* we have recorded an instance of fumigation resorted to for the purpose of guarding against the plague, and of retarding its increase when it prevailed. The pestilence broke out among them, and Aaron

* See Numbers xvi. 47.

took his censer and placed therein his incense of aromatic spices, and standing between the living and the dead, the plague was staid.

Nor is profane history less fruitful in its recorded instances of pestilential and contagious diseases, as well as in the precautions observed to prevent the spread of infection.

We have reliable authority, from the writings of ancient philosophers, physicians, and poets, for the opinion, that a belief in the contagious nature of disease has descended from remote antiquity, was entertained by the physicians of Greece and Rome, and that precautions were taken at that early period to prevent its spread, however crude and conjectural their views on all these points may have been.

According to Hecker,* who wrote on the epidemics of the middle ages, "So far back as the age of Plato, a knowledge of the contagious power of magignant inflammations of the eye was general among the people."

He also tells us that "Arrangements for the protection of the healthy against contagious diseases were regarded by the ancients as useful, and by many were carried into effect in their houses. Even a total separation of the sick from the well, that indispensable means of protection against infection by contact, was proposed by physicians of the second century after Christ, in order to check the spread of leprosy." It is asserted also that they were as well informed on the subject of the propagation of contagious diseases as the moderns. This knowledge was shown in their practice for arresting the progress of murrains among their cattle, by a separation of the diseased from the healthy; and if they neglected to resort to means of public protection against pestilential disease, the reason may in part be sought in their disregard for human life, for which the nations of antiquity were somewhat distinguished. Hecker, who refers to this fact, well remarks, that no especial proof is needed of the

* Hecker's Epidemics of the Middle Ages, p. 54.

circumstances that the governments of those days were not yet so far advanced as to put into practice general regulations for checking the plague. "Physicians could, therefore, only advise public purifications of the air by means of large fires, as had often been practised in ancient times, and they were obliged to leave it to individual families, either to seek safety in flight, or to shut themselves up in their dwellings." (55.)

Purifications of the air were resorted to in the fourteenth century, to prevent the contagion of pestilential diseases. The College of Physicians of Paris issued their opinions on the causes of the black plague, and gave specific directions for its prevention. One among others was to kindle large fires as well before as after the rains in July, which, in consequence of the distempered state of the atmosphere were, from a mist, "converted into a stinking deleterious rain." These fires were to be made of vine stalks, laurel or other green wood. Wormwood and chamomile were also directed to be burned in quantity in the market-places, in densely inhabited localities, and in the houses.

Gentilis of Foligno, who was a celebrated teacher in Perugia, a central city of Italy, taught the same doctrine of the burning of odoriferous wood in the vicinity of the healthy as well as of the sick, to prevent contagion. He also directed the healthy to wash "frequently with vinegar or wine, to sprinkle their dwellings with vinegar, and to smell often of camphor, or other volatile substances."

Guy de Chauliac, a distinguished physician in the fourteenth century, believed in pestilential contagion, and adopted the usual plague remedies, said to be derived from the Arabians, to protect himself against its infection. He it was who advised Pope Clement VI., then resident at Avignon, to shut himself up in his palace on the appearance of the plague in that city,

* Hecker, pp. 53, 4.

and subsequently recommended him to retire to Beaucaire, where the disease had not yet penetrated.

A contemporary with Chauillac, Galeazzo di Santa Sofia, a learned physician, a native of Padua, held similar views as regards pestilential contagion, and the mode of guarding against it; as did also Chalin de Vinario, Valescus of Taranta, and other physicians of that early age.

These historical notices of the knowledge of pestilence and contagion existing in the fourteenth century, and which agree with the opinions that were held in subsequent centuries, are entirely at variance with those advanced by Maclean as to the origin of pestilential contagion in the sixteenth century. He confidently asserts that the doctrine of contagion is not to be met with in the works of the ancient physicians. He says, "The first traces of it which we meet with, are in the 'Tales' of Boccaccio;" and that the first methodical treatise in which mention is made of it, is the work of Fracastorius, published at Venice in 1546. It being at that time an object with the See of Rome to translate the Council of Trent to Bologna, this was effected by persuading the fathers of the Council that a contagious epidemic prevailed at Trent, the contagion of which Fracastorius affirmed "was particularly dangerous to persons of rank!" While it is believed that the opinion of the existence of a contagious principle, influencing the spread of disease, may be traced as far back as the days of Hippocrates and Thucydides, if not anteriorly, still we agree with Maclean, that the above manœuvre, originating as it did with a distinguished ecclesiastic, forming "an impediment in the way of investigation among the faculty—pestilential contagion became therefore firmly established by the highest authority." In the language of an eminent American author, it "was a medical creed, and a corresponding code of sanitary laws being imposed on Christendom, by giving the stamp of sanctity to error and superstition, have retarded the progress of knowledge, destroyed

millions of human lives, wasted hundreds of millions of property, and produced through other channels, incalculable misery."^{*}

This writer also informs us, that by the same ecclesiastical influence, "Lazarettoes, the product of the hypothesis of contagion, were placed originally under the management of the clergy, and so continued for more than two centuries."[†]

By quarantine is understood, according to McCullough, that "regulation by which all communication with individuals, ships, or goods, arriving from places infected with the plague, or other contagious disease, or supposed to be peculiarly liable to such infection, is interdicted for a certain definite period."[‡]

Maclean defines the professed ends of sanitary laws, in which he includes quarantines, to be "to prevent the exportation, importation, and spreading of pestilential contagion. Their means are, accordingly, for the first, airing or purification of goods, and patents or bills of health; for the second, quarantines and lazarettoes; and for the third, lines of circumvallation; ditches; single, double, and treble cordons of troops; single, double, and treble walls; and in general all modes of separation, seclusion, and restriction."[§]

The report on Quarantine presented to the General Board of Health of England says: "The object of Quarantine is to prevent the introduction of epidemic diseases from one country into another, and its regulations are based on the assumption of the contagiousness of the diseases with which it deals; it being supposed that such diseases are propagated by contact, direct or indirect, of the unaffected with the affected. In accordance with this view, the preventive means adopted as Quarantine, consists of the isolation of the sick or suspected;

^{*} Caldwell, *Thoughts on Quarantine*, p. 40.

[†] *Ibid.* p. 22.

[‡] McCullough's *Commercial Dict.*

[§] Maclean on *Pestilential Contagion*, p. 2.

with whom it interdicts all communication, whether by person, or by articles deemed capable of transmitting contagion.*

Webster's definition of Quarantine is "to prohibit from intercourse with a city or its inhabitants; to compel to remain at a distance from shore for forty days, or for other limited period, on account of real or supposed infection; applied to ships, or to persons and goods."†

According to the Statute of New York State in reference to Quarantine, it is "to prevent the spread of pestilential or infectious diseases; to protect the community, and to guard the public, as well against those diseases which are not indigenous here, but which, coming from other countries, carry dismay and death with them."‡

From all these various opinions the conclusion may be gathered that Quarantine measures should only be regarded as precautionary in their character and plans; but, through ignorance and superstition their advocates have been "blindly intent on accomplishing an impossible object;" and now, after the lapse of several centuries, the same coercive and isolative regulations are attempted to be enforced, and the same implicit confidence to be reposed in them by governments, which were pursued, and which infatuated the misled originators of Quarantine in the fourteenth century.

The term Quarantine is said to come directly from the Italian word *quaranta*, signifying *forty* § Why forty days were fixed upon as the period for purification from disease, has nowhere been particularly explained. By some, it is said not to be of medical authority, but to have its origin from a superstitious regard for the fast of forty days called Lent, a period of abstinence, instituted by the Church for the purifica-

* First Report Quarantine, p. 4.

† Webster's Dictionary.

‡ Report of Com. on Quarantine, N. Y. Legislature, 1849, p. 4.

§ Why not rather from *quarantigia*—guarantee, security?

tion of the soul; which institution was founded on the forty days' fast of our Saviour in the wilderness. Hence, it is said, the superstitious institutors of Quarantine demanded forty days to purify merchandise, ships, and other articles, as well as persons, from pestilential contagion.* Hecker† suggests, that the appointment of a forty days' detention was not dictated by caprice, but probably had a medical origin, derivable, in part, from the doctrine of critical days. He says: "The fortieth day, according to the most ancient notions, has been always regarded as the last of ardent diseases, and the limit of separation between these and those which are chronic."

The period of Quarantine, however, is quite as likely to have reference to the time of purification practised during the patriarchal ages. Moses, the lawgiver, revealed to his people certain laws for the cleansing of legal impurities, as the touching of a leper, &c., some of which impurities, the sacred historian informs us, required forty days for their cleansing, and in all probability the wandering of the Israelites in the wilderness, before they were deemed worthy to enter the promised land, had its influence in the establishment of this system of medical purification.‡

On this disputed and obscure point, however, no decision will be attempted, as the only purpose is, to give an outline of the period when these political means of protection from disease came into existence.

We have seen that ere the great epidemics of the fourteenth century had ceased their fearful ravages, contagion had attracted considerable notice, and that the possibility of protecting entire cities from pestilential diseases was beginning to

* Caldwell's Thoughts on Quarantine.

† Hecker's Epid. Middle Ages, p. 60.

‡ Caldwell, Thoughts on Quarantine, p. 6.

occupy attention, by the suggestion of some effectual mode of defense.

Rude and imperfect measures for the prevention of disease and purification from contagion had been established in the East from an early period. During the sway of the Eastern emperors, the practice of separating from the rest of the community, individuals arriving from places where the plague prevailed, or who had visited or come in contact with the sick, and of placing them in charge of proper guards, was adopted. Nor was the necessity of separation less appreciated in Egypt, where the Copt monks were from early times in the habit of confining themselves in their convents on the breaking out of the plague, and interrupted all communication with their neighbors, so long as the disease prevailed. This precautionary measure, which was imitated by the European merchants residing in Alexandria and Cairo, was adopted in France and Italy, where the plague, or pestilential disease considered as such, had long been known. It attracted particular attention there on the breaking out of that disease soon after the return of one of those military expeditions undertaken by Christians for the recovery of the Holy Land from the power of the infidel, though more particularly somewhat later on the arrival from the Levant, of vessels containing plague patients, and from which the disease was supposed to spread. From its great mortality on such occasions, and its supposed contagious character, it excited, even at those early periods, an unusual degree of attention.* It was soon discovered that those who avoided the sick escaped. Building on this hypothesis, measures for defense were early instituted, to avoid all communication with persons affected with the disease, and to prevent all intercourse with places where the plague prevailed. But it was not until the fourteenth century that attempts were made to enforce legal restrictions

* White on Plague, p. 73.

against the introduction of this and other really and supposed contagious diseases.

We know from the testimony of Boccaccio, in his well-known Decameron, that Florence used means for her preservation in 1348. The city was cleared of much filth under the direction of the officers appointed for that purpose; access was denied to all sick persons, and many advices were proposed for the preservation of health. But, as Russell remarks, "In that plague no prudence nor human precaution could prevent the contagion from spreading." We know also that the other free cities of Italy—Venice, Genoa, Pisa, &c.—though they might not have established regular quarantines, such as they came to possess subsequently, used occasional precautions to avoid infection from the plague.*

The earliest, and perhaps the first legal act, known to the world for the prevention of disease by the institution of a regular Quarantine originated with Viscount Bernabo, of Reggio in Italy, and is dated 17th January, 1374.† This injunction required that "every plague patient be taken out of the city into the fields, there to die or to recover."‡ Their attendants were forbidden to associate with any one for ten days. The priests were required to examine those that were diseased, and point to special commissioners the persons infected, under a penalty of the confiscation of their goods, and of being burned alive. The goods of those who imported the plague were confiscated, and none, except those appointed for the purpose, were allowed to attend plague patients, under penalty of death and confiscation. Cruel and inhuman as these regulations appear to be, they were not only strictly enforced, but in 1388 Bernabo "forbade the admission of people from infected places into his territories on pain of death." This example of Bernabo was

* Russell on the Plague, p. 329

† Hecker, pp. 61, 2, 2.

‡ Hecker. pp. 61, 2, 2.

followed in numerous places, and enforced with all the obdurate spirit of the age. The extremes of severity were so far exercised by the executioners of the law, as to cause to be avoided with horror, to force into exile, or to burn to death, any individual who would expose himself to the last look of sympathy from a beloved departing friend.

In 1399, Viscount John imitated the example of his predecessor when the disease appeared again, but in rather milder terms.

The city gates were strictly guarded, and strangers from infected places were denied admission. Infected houses were ventilated for ten days, purified and fumigated by the burning of balsamic and aromatic substances, and by other processes of disinfection. In process of time the benefits of this system of segregation of the sick, and of non-intercourse with infected places as a means of self-preservation, began to be popular and generally practised.

But we have no account of any well-defined legal code of regulations being introduced until about the middle of the 15th century, when, as observed by Hecker (64), it was of the most consequence to oppose a barrier to its entrance from Asia, Africa, and Greece (which had become Turkish). At this period the world-renowned prosperity of the maritime commerce of the once-proud Venice was at its highest point of success.

Monopolizing the principal trade of Constantinople and the Levant, while her richly-laden vessels were visiting every coast of Europe, it is not surprising that this ancient and flourishing capital, which had suffered severely from pestilence, should have found it necessary to establish a *cordon sanitaire*, in order to guard against the introduction of pestilential diseases from abroad.*

* So early as 1348, they had health officers, and in 1423 established on the island of Santa Maria of Nazareth, belonging to the order of Augustine, an hospital for the seclusion of individuals attacked with the plague. From this

Fearing the consequences from the appearance among them of a disease so dreadful in its visitations as the plague, which at this period was spreading among the sea-ports of the Mediterranean, and doubtless in possession of information as to the advantages resulting from the entire separation of the sick, and from non-intercourse with infected places, the Senate, in 1448, instituted a code of quarantine, seemingly arranged on scientific principles, by the enactment of a digest of laws, known from that period to the present, as the *Laws of Quarantine*.*

The code thus legalized, obliged all ships arriving from suspected places, to undergo a term of probation, before they could be allowed to enter the port and discharge their cargoes. Individuals were similarly treated.

A few years anterior to the passage of these laws, the first regularly organized lazaretto, or pest-house, was established. It was erected, as already stated, in 1423, on a small island near the city, and called *Il Lazaretto Vecchio* (the Old Lazaretto). Another was erected on another island, in 1468, under the title of *Il Lazaretto Nuovo* (the New Lazaretto).†

All persons arriving from places where the existence of plague was suspected, were there detained.‡ The sick from the city, laboring under the disease, were sent with their families to the former station, and when cured, were kept still forty days longer in the latter, or New Lazaretto.§ Genoa, it is said, had her lazaretto in 1467.

island, according to Frari, the name of Lazaretto is derived. Others, with seemingly more propriety, derive the word from the Hospital of St. Lazarus, established at Jerusalem, by the Crusaders, for the accommodation and seclusion of lepers.

* White on Plague, p. 75.

† Beckman's History of Inventions. Art. Quarantine.

‡ Howard in his History of Lazarettos, says it was instituted in 1448, p. 12.

§ Hecker.

At a still later period, 1485, when, among the cities of northern Italy, Milan especially felt the scourge of the plague, the Republic of Venice established the first board of health.* It consisted of three nobles appointed by the Grand Council. They were called the Council of Health, and were ordered to investigate the best means for preserving health, and for preventing the introduction of disease from abroad.† The efforts of this Council not being entirely successful, their powers were so enlarged in 1504, as to "grant them the right of life and death over those who violated the regulations for health." No appeal was allowed from the sentence of this tribunal.‡

Bills of health are said to have been introduced for the first time in the year 1527, during a fatal plague in Italy which lasted five years, and thus rendered necessary redoubled caution. In 1596, the Turkish company at Aleppo also established the practice of issuing bills of health.§ They were made obligatory in England early in 1636, but they did not become general until the year 1665.||

Following the example of the Venetian oligarchy, Quarantines and Lazarettoes began to multiply as a means of protection, among other powers along the shores of the Adriatic; until at length the constituted authorities of other commercial nations, believing in the absolute necessity for external police restrictions, founded on the doctrine of contagion, began to establish similar laws for the preservation of their maritime cities, from imported diseases.

* In 1791 Howard, who wrote on Lazarettoes, visited Venice, and in speaking of their Quarantine says: "In every department there is such remissness and corruption in executing the regulations, as to render it almost useless, and little more than an establishment for providing for officers and infirm people."

† Le Bret's History of the Republic of Venice.

‡ Ibid.

§ Russell on Plague, p. 318.

|| Hecker, p. 65.

A somewhat full account of the systems of Quarantine which, until very recently, were in force in the Mediterranean, is furnished by Dr. G. R. B. Horner, of the U. S. Navy.* As the regulations at Port Mahon are prototypes of all others in the same region, the liberty is taken of condensing his interesting and faithful description.

Like quarantines elsewhere in the civilized world, these regulations are unnecessarily severe and restrictive—both inconsistent with themselves and extremely vexatious and oppressive. To commerce they are equally embarrassing, injurious, expensive, and prejudicial. "What," says Dr. Horner, "can be more unreasonable than that a ship arriving at Cadiz, in the Atlantic, from the West Indies or any other place, considered unhealthy, should be obliged to proceed to Port Mahon, distant five hundred miles, without an allowance for the time consumed, discharge her cargo, incur additional port taxes, and ride out a quarantine of thirty or more days?" This imposition, which increases the expenses while it protracts the voyage, is only a small part of the burden. To form a correct opinion of the objectionable features of the quarantine system as pursued in the Levant, and the evils resulting therefrom, it is required to enter into a careful examination of its several details, which it is utterly impossible to undertake in this report.

"The quarantine station at Port Mahon," says Dr. Horner, "is the place to which every vessel, arriving at any port in the kingdom, must resort for riding out her Quarantine." "The lazaretto establishment," he remarks, is by far the most extensive and important of the kind belonging to Spain. It is not excelled by any in the Mediterranean." This lazaretto was founded in 1794. It occupies twenty-five acres of ground. The quarantine ground or anchorage for vessels is either in the port itself or in pest-harbor

* Horner's Obs. Select Med. Lib.

No vessel at Port Mahon is considered strictly quarantined until all movable articles thought to be infected are taken out of her and purified. Vessels from suspected places, or having disease on board, undergo a detention of twenty days. No allowance is made for the length of the passage. Vessels from the United States, "where Yellow Fever exists *exotically* or *indigenously*, are considered to be infected." "Finally," Dr. Horner says, "every vessel which has come from any port on the globe, where the inhabitants at the time of sailing were suffering from any pestilential or contagious disease, is quarantined, even after its extinction, until the Supreme Junta (the Council of Health) has declared the place to be in a state of health."

Of the system of purification for infected vessels Dr. Horner speaks in the most disparaging terms. "The vexations of Quarantine are nothing in comparison" with it. The vessels of unclean patent are sent to pest-harbor, unladen, "scuttles and hatches opened, washed within and without day after day, and fumigated every four days" with a disinfecting mixture. The sails, and sometimes the clothes of the passengers and crew, are immersed in sea-water for twenty-four hours. Those vessels having had disease on board, undergo washing and fumigation for six consecutive days, and their Quarantine is extended to forty days. "As for the crew and passengers, they are fumigated every ten days, and woe to the unfortunate wretches affected with asthma, or any other complaint of the respiratory apparatus." After all these operations have been gone through, both with the vessel and crew, a third of the quarantine having expired, they are allowed to leave pest-harbor for Quarantine Island, where they remain until pratique is obtained. "Letters, newspapers, and documents are even worse treated than goods;" they are cut, perforated, their envelopes torn off, fumigated, immersed in vinegar, and exposed to the air. After this, they are care-

fully and cautiously handed to their owners by tongs or prodigious length, and then they are scarcely in a condition to be read. Heavy penalties are imposed for the smallest violations of any of the regulations. "Besides these, there are many more regulations, equally strict, and well calculated to render the quarantines of Spain extremely irksome, tedious, and distressing to those who have the ill-luck" to get within their power, and be subject to their imposition. To this may be added, that when, in any of these ports, or in any inland places, a disease really or supposed to be contagious breaks out and assumes an epidemic form, the inhabitants are placed in sequestration, and strictly prevented from going out. The same rule applies to the residents of infected districts, or even of infected houses. This has often been exemplified in Spain in regard to the Yellow Fever.

The earliest record of an authentic* character ascribes the origin of preventive measures for protection from the plague in England to the people of Gloucester in 1348. It was during the prevalence of the most extensive and distressing pestilential epidemic that the world ever experienced. Commencing, according to the best authorities, in 1345, in China, it overran Asia, Africa, and Europe. In 1348, it made its appearance in Avignon, an inland city in the south of France, and from thence is said to have found its way into the sea-port town of Dorsetshire, and in a short time passed into Devonshire and Somersetshire as far as Bristol. During this progressive and fatal march of the epidemic, the citizens of Gloucester determined to cut off all communication with Bristol, where it was at the time prevailing, and forthwith interdicted by a *cordon sanitaire* all intercourse with those who came from the infected city, thus thinking that by this quarantine regulation they would escape the infection and save their city

* English Chronology.

from the fearful destruction of the pestilence which was raging in other communities. But this initiatory preventive measure failed entirely. The disease not only swept Gloucester, but reached Oxford and London, and eventually traveled over the whole country.

In 1540, during the reign of Henry VIII., the attention of magistrates was directed to the prevention of infection by prohibiting barbers from "using surgery" or "exercising barberry" for fear of their communicating disease through persons who had been infected with the pestilence, and such other contagious infirmities.

Previous to the year 1604, there had existed no legislative or parliamentary act in relation to persons infected with plague. All orders and regulations respecting the infected were issued in royal proclamations or by the municipal officers in towns, and in the country by the justices of the peace, but all under the king's sanction. Such orders were also issued by Queen Elizabeth in 1592. In the same year, the College of Physicians of London published their medical advice to the infected, which they had done before on several occasions from about the middle of that century. What these directions were we have no opportunity of knowing; but, in the orders published by his Majesty James I., and his Privy Council, the 30th July, 1603, and drawn up with great care, consisting of a number of articles, we find among others the following precise regulations having a direct reference to Quarantine restrictions:

"The fifth article regards the shutting up of infected houses, whether in town or country, the term of quarantine being six weeks, and infractions of it punished by imprisonment in the stocks." "By the seventh, attendants are provided for persons in quarantine."*

* Russell, p. 480.

These regulations, put forth by the civil magistrates, however, were so frequently disregarded and violated, that legislative action became necessary. In 1604, the year after a plague in London, the Parliament, by an express act (which is the first legal quarantine law in England), found it necessary to interfere in order to sustain and enforce the regulations adopted by the different municipalities.

This statute required every person residing in houses infected with the plague, to keep within doors, under a penalty of being "punished as a vagabond by whipping." And any person found going abroad with the disease on him, "he then shall be guilty of felony."

This act of James I. did not pass without opposition, but remained in force until 1640, the sixteenth year of the reign of Charles I., when, by an act of Parliament, there having been previously much dissatisfaction, it was resolved to continue it "until some other act be made touching its continuance or discontinuance."

In 1665, the plague raged in London, and, according to the journal of the House of Commons, strenuous efforts were made to supply what were deemed to be defects in this bill, and to provide further remedies to prevent the spread of contagion; but the advocates of the measure did not succeed, "and the matter never having been resumed since, the statute of James I. remains still in force."* (1791).

In the year 1663, the College of Physicians of London published their directions and recommendations (which were enjoined by royal authority) in regard to the necessity for quarantining "men and goods from foreign infected places, or from any suspected places beyond the seas or in the land," without certificate of health, or else either to be sent suddenly away or to be put to the pest-house or such like place for forty

* Ibid. p. 482.

days (according to the custom of Italy); but, in 1665, they republished their directions and altered the title to "prevention of propagating the infection from place to place," for, as it has already been shown, a regularly constituted quarantine had been legally enacted by Parliament, and this change was intended to correspond with the provision made by authority.*

In this year, 1665, infected houses were not only quarantined, and shut up for one month after all the family were dead or recovered, but a guard was placed in front, day and night, to keep out visitors, and a large red cross, with the words, "Lord, have mercy upon us," painted on the door.†

But, notwithstanding all these rigorous restraints, and the cruel and inhuman imprisonment of the sick and the well in their own houses for many weeks, it did not prevent the spread of the epidemic plague. We are told by Dr. Mead, who was a profound contagionist, but who wrote against the cruelties practised toward the sick and infected, that, in this same year, 1665, the disease spread itself over a great part of England.‡

At what period quarantines were established in France, no precise data can be furnished. We have seen that the propriety of separating the sick from the healthy for the purpose of arresting the progress of diseases supposed to be, or which really are, possessed of a contagious and pestilential character, was there early admitted. The black plague had swept her cities quite early in the 14th century. The medical faculty of Paris, avowedly the most celebrated in existence at that period, were consulted, and laid down many appropriate rules for living during the prevalence of the pestilence, and sundry

* Russell, p. 348.

† Mead's History of Plague, p. 203.

‡ Ibid. p. 167.

sanitary regulations of more or less doubtful efficacy, intended to suppress or lessen the progress of the calamity. Even long before, attention had been called to the subject, and sanitary measures resorted to, to guard against the extension of certain complaints reputed to be communicable. Leper-houses, for example, were early established, and gradually multiplied to such an extent in many parts of the kingdom, that in 1225, in the reign of Louis VIII., their number exceeded 2000.

It may be inferred, also, from certain facts referred to in the professional annals of the 14th and succeeding centuries, that a belief in the advantage of closing the avenues to various parts of the kingdom against the introduction of individuals affected with the plague, or who had been exposed to the infection, as also of merchandise and personal effects supposed to be tainted with the poison, was by many entertained. But for reasons already stated, measures necessary for that purpose were not carried into effect in France any more than they were in other countries of Europe, and there, as elsewhere, little was done in that view for a long while except by medical men who, in imitation of Guy de Chauliac, already cited, endeavored to arrest the progress of the plague by recommending to their patients and friends to fly from the infected place, or to isolate themselves in their dwellings. Some measures of a preventive kind were, however, occasionally adopted by public authorities; but they were mostly of local application, or had reference to some particular disease distinct from the plague. Against the venereal disease, measures of a stringent character were thought advisable. In 1476, the Parliament of Paris enjoined, under pain of death, on all individuals affected with this complaint, to retire to their lodgings, and there remain in seclusion till restored to health. Strangers so affected were consigned to St. Germain-des-Prés, where houses for their accommodation were provided. Similar arrangements were made at Toulouse in 1518.

In imitation of some of the free Italian cities, to which reference has been made, Marseilles established a lazaretto in 1526, or 1527. But prior to this period, houses for the accommodation of persons affected with the plague appear to have been in existence, and, in 1476, the consuls of that city were ordered by King René to apply to those establishments the regulations adopted in regard to leper-houses. At a somewhat later period, in 1586 and 1587, the plague having caused a very heavy mortality, and the preventive measures heretofore resorted to having completely failed to effect the object for which they had been instituted, attention was more particularly called to the necessity of devising further means of security against the introduction and spread of the disease, and to the propriety of establishing regular infirmaries or lazarettoes for the seclusion and treatment of persons infected, and retention of crews of ships coming from the Levant, or other suspected ports, as well as for the reception, unpacking, and purification of merchandise, clothing, &c., suspected of carrying the seeds of the poison.

It is from this period we may date the establishment, by the public authorities of Marseilles, of the system of isolation, sequestration, and purification, which, properly speaking, constitutes the quarantine system. Nevertheless, it was not until after the great plague of 1720 and 1721 that a comprehensive plan of a general, specific, and permanent system was suggested and carried into effect. Whatever measures of prevention had been instituted previous thereto, were, in a great measure, akin to those adopted in other European places. They were arbitrary and vexatious in their character. Much latitude was left to the intendants of health, who, being selected annually from among the merchants of the city, were not always well qualified to have unlimited control in matters involving the sanitary condition of the country, and to regulate the time of quarantine and the entries of suspected

merchandise, while an almost entire reliance was placed on clean bills of health furnished by the French consuls in the Levant.

The general plan referred to was extended to Toulon and other French ports of the Mediterranean, and indeed to any place of the vicinity where the infection might be carried or break out. It was most stringent in its enforcements and minute in its details, enjoining, as it did, under heavy penalties, the sequestration of the residents of all infected quarters, streets, or houses. The plan was adopted with slight modifications at Leghorn, and imitated in other parts of Italy, as also in Spain, Portugal, &c.

While this was being done at Marseilles, a general expurgation or purification of the city, streets, churches, vaults, public buildings, houses, &c., was ordered and carried into effect, to prevent a revival of the infection. It was submitted to without demur, but when, on the return of the distemper some time after, it was proposed to have recourse a second time to this measure, it was effectually opposed by a deputation of the Chamber of Commerce and the principal merchants, as being a new custom unknown to all other towns of Europe, as unnecessary, inconvenient, and impossible of execution, without extreme prejudice to the commercial world.

The institution thus formed presented at first simply a municipal character ; but at a later period the special administration which, under the title of Intendants of Health, had been charged, in Marseilles and Toulon, where alone vessels arriving from ports suspected of being infected with the plague could be received, with the application of the sanitary regulations, succeeded, not without many a struggle, in rendering themselves independent of the municipalities from which they had originally derived their power. This sort of independence as we learn from Mr. Tardieu, from whom this statement

is borrowed, was successively confirmed in France by a large number of royal edicts, and a certain extent of jurisdiction was accorded to the Sanitary Intendance of Marseilles, which retained the supremacy resulting therefrom until a comparatively recent period.

Prior, however, to the year 1822, the Sanitary Police of France was not established by law. For, inasmuch as, in accordance with the existing regulations, vessels from ports suspected of being infected with the plague, could only be received in the two cities mentioned, it was not necessary to establish sanitary measures against that disease on the coast of the Channel and of the ocean. Besides this, the Yellow Fever had heretofore excited but little alarm in France, and given rise to only temporary and local measures, while the Asiatic cholera was scarcely known even by name.

The appearance of the Yellow Fever in Catalonia, near the frontiers of France, having become a source of anxiety among a large portion of the population, the government, then under the influence of individuals among whom ideas of contagion were predominant, obtained from the Chambers the passage of a law which until recently constituted the basis of the French sanitary system. This law bears date March 3d, 1822, and was carried into effect by a royal ordinance, issued on the 7th of August of the same year. It was violently opposed, especially by the late Dr. Chervin, so far as regards its application to the Yellow Fever, and was repealed, in that connection, a short time after the death of that estimable and indefatigable physician. In relation to the Asiatic Cholera, against the introduction of which the same law was to provide, the government soon found that neither Quarantine nor sanitary cordons could arrest its progress. Hence the law became a dead letter. Even in regard to the plague itself the law was gradually modified, principally through the influence of MM. de Segur, Dupeyron, and Aubert-Roche, who pointed out in a

way not to be set aside, its inconsistencies and unnecessary oppressiveness; but more especially through the effects of the remarkable report on the plague and quarantines, presented to the Academy of Medicine of Paris, by a special commission appointed for that purpose. This report was soon followed by an almost complete reform in the sanitary systems of the country. The new code was promulgated by a royal ordinance, dated August 18, 1847, and two decrees issued on the 10th of August, 1849, and the 24th of December, 1850. Finally, France did not rest satisfied with what she had done in the way of reform, but took an active part in the adoption of other measures, to which attention will be called presently.

The best account that can be found of the early quarantine system in Holland is that furnished by Dr. Richard Mead, in the preface to his discourse on the plague. It is contained in a letter from Mr. Backmeister, of Hanover, the King's Secretary of German affairs, and who issued the orders for the execution of the measures directed by his majesty, when the plague in the year 1712 entered his German dominions.

After reciting the names of the several towns and villages where the plague raged in 1712 and 1713, he says: "As soon as any village was infected, the first thing done was to make a line round it, thereby hindering the inhabitants from communicating with others." They were then furnished with provisions, physicians, nurses, clergymen, buriers, &c. The sick were separated from the sound, and the infected houses cleansed. The sick were obliged to leave their homes and retire into a lazaretto or hospital, constructed for that purpose. The well persons residing in the houses with the infected, were required to change their clothes, which were burned, put on others provided for them, and perform quarantine for a certain number of days in a house provided for that special object. Those who recovered from the plague underwent a similar purification. These houses, when in the country, were

afterwards destroyed, with their contents, by fire. Infected houses in the towns were nailed up for a certain period, after the goods, and other articles susceptible of contagion belonging to them, were removed out of the town and burned. All cattle found about the premises of infected houses were killed, and buried ten feet under ground.

It is very clear that Dr. Mead either made the above suggestions to the authorities of Holland, or derived his own notions of a quarantine from their system. The letter referred to was at his own solicitation, for he says: "I was desirous to know how far the measures then taken agreed with my directions, because I had been informed they were very successful, and I have the satisfaction to find them very conformable to my directions." This would appear as if he had advised the above regulations, which were carried out in Germany, seven years before his system was adopted in England; but in his letter to the Secretary of State in 1720 in answer to the request of the Lords Justices, that he should prepare some directions, &c., for the public safety from the plague, he writes thus: "The first, which relate to the performing quarantines, &c., you, who are perfectly versed in the history of Europe, will see, are agreeable to what is practised in other countries." This system of lines and trenches to keep out the plague was not original with the authorities of Holland, nor yet with Dr. Mead, as it had been adopted in France at a still earlier period.

The quarantine regulations pursued in Holland in the seventeenth century are said by Porter, in his observations on the plague, to have been imperfect; but from a treatise on the plague by Philip Rose, M.D., a member of the College of Physicians, and dated London, 1721, we learn, if his account is to be relied upon, that their system was uncommonly rigid. He says: "In Holland and Flanders, they have fenced themselves as much as possible against the contagion. They ordered a quarantine to be performed by ships coming from

suspected places. Not contented with this, they ordered that all suspected ships with their cargoes, should be burnt. The ship's crew must wash and dip in the sea, and I suppose fresh clothes were ordered for them, to put on after their own were burned; subsistence was left at some good distance, which the quarantine men must fetch at certain hours."^{*}

Until the the year 1710, all regulations in England concerning quarantine were temporary in their character and effects; and prior to 1604, were issued by the king in council, in a proclamation without the interference of Parliament.

This second quarantine act in 1710, in the ninth year of the reign of Queen Anne, entitled an act "to oblige ships coming from places infected, more effectually to perform their quarantine," was prepared and hurried through both houses in a very short time; received the royal sanction within eight days after it was ordered, and went into operation two days afterwards. The reason for all this haste was, that the King's regulations might be more authoritatively enforced by legal interposition in future, and inasmuch as the plague was then raging at sea-ports in the Baltic. It was soon found, however, to be an imperfect bill, and in the following reign of King George I., was repealed. This took place in 1721, in consequence of an alarm that the plague was prevailing at Marseilles. The bill was introduced into the House of Commons December 17th, 1720, and received the royal assent on the 25th of January, 1721. It was entitled an act "for the better preventing the plague being brought from foreign ports into Great Britain or Ireland, or the Isles of Guernsey, &c., and to hinder the spreading of infection."[†] Several supplements were added to this bill subsequently, one of which was "to enable his Majesty effectually to prohibit commerce for the space of one year with any country that is, or shall be,

^{*} Russell, p. 341.

[†] Russell, p. 442.

infected with the plague."* These special acts of George I. were limited in duration, and expired in 1723, at which time the act of Queen Anne, of 1710, was revived.

The act of George I., which passed Parliament and became a law in 1720, was the one drafted according to the suggestions made by the celebrated Dr. Richard Mead, in his discourse on the plague, written at the instance of the Lords Justices in the absence of his Majesty. The plague at this time was prevailing at Marseilles, and the English Health Laws, not being of sufficient force for protection, the authorities were alarmed, and requested Dr. Mead to draw up his views and furnish necessary directions for the occasion.

It is superfluous here to give the precise language of the suggestions made by Dr. Mead to prevent the spread of the plague in cities, as they have already been presented in the Holland regulations. Suffice it to say, however, that in regard to the importation of contagious diseases, a doctrine in which he was a firm believer, he advised the erection of lazarettoes on islands near to sea-ports, for the reception of men and goods from infected places. Here they were to be detained forty days. In case of sickness on board a ship, the clothes of the crew were to be sunk in the sea, and the sick were to be separated from the well; the cargoes to be removed to the lazarettoes, and the goods aired forty days. When there was an arrival from any port where the disease was raging, he recommended both goods and vessels to be sunk at sea.

Many of these directions were strictly followed out by the government in their quarantine acts, and as rigidly enforced.

The severity and inhumanity of several of the sections of the act of 1721, that of King George I., which pronounced sentence of death on all infected persons escaping from quarantine, was no doubt the cause of their speedy repeal in the

* Russell, p. 443.

same year. One section of this law, subjecting well persons not liable to quarantine, who had entered quarantine and escaped therefrom, to a felon's death, was retained in the several acts passed since that time.

In 1728, the first year of George II., another act was passed, which was also limited, and expired in 1731. This act was both arbitrary and severe. A violation of the law deemed such persons guilty of felony, and forfeited both ship and goods.

At a subsequent date, 1733, this bill was revived, and continued until 1735, from which time, until 1753, the act of Queen Anne was the quarantine law.

It was during this interval, that the building of permanent lazarettoes was first agitated in England, in the year 1743, when the plague was raging at Messina, in the Levant, between which place and London there was carried on a considerable trade.

Temporary or floating lazarettoes were then in existence, and were used for the purpose of airing infected goods from vessels under quarantine. They consisted of the hulks of small vessels called hoys or lighters, and were anchored some distance from the shore in Standgate creek, which emptied into Medway river, a tributary to the Thames. This plan was an improvement on a former system, requiring infected vessels to come to an anchor and perform a quarantine off the Scilly Islands, near St. Helen's pool.*

In 1752, the scheme for throwing open the trade of the Levant, which had been confined to a Company by a grant of Parliament in the 17th century, was again revived; as this change would require new precautions for the prevention of the plague, the establishment of good, secure, and proper quarantines, with lazarettoes, and other conveniences, &c., was proposed to Parliament.

* Russell, p. 450.

The charter of this ancient Company not only required clean bills of health from all vessels arriving from the Levant, but obliged them to perform a quarantine of from twenty to forty days previously to leaving the place from whence they had sailed. These arrangements not being considered sufficiently precautionary, inasmuch as the plague had appeared several times in England since the organization of the Levant Company, and the enforcement of their foreign regulations to prevent the importation of disease; and as the contemplated change which was to throw the trade open to all navigators, was calculated to render the regulations of the old Company still less effectual, a committee of the whole Parliament and Commons was resolved upon, in order to take into consideration "the most proper and effectual manner of performing quarantine."*

The result of this inquiry was a resolution to erect a lazaretto on Chedney hill, near Standgate creek. Plans and estimates were ordered but nothing more appears to have been done until 1764, when it was again renewed in Parliament. Here it rested until 1772, when the Legislature, having done all that could have been expected of them to forward the establishment of regular and permanent lazarettoes, allowed the subject to rest, and from that time to the present, the purification and airing of goods and merchandise have been performed on floating hulks.

At this period, also, the quarantine act of George II., which, after repeated modifications (having been previously limited in its duration), went into operation March 1, 1754,† for an indefinite period.‡

Until the year 1770, Standgate creek, near the river Medway, was the appointed place of quarantine for ships. In that year the officers of customs had the power conferred upon

* Russell, p. 484.

† It appears that this act was amended again in 1783.

‡ Russell, p. 447.

them to select other places ; but in 1780, the King's Council fixed the stations as follows : seven in England, four in Scotland, and two in Jersey and Guernsey. These regulations were in existence, with but few alterations, until a very recent period.*

During the present century almost an entire change has taken place in the professional as well as in the public mind in England on the subject of quarantine and its restrictions. According to a statement made by the General Board of Health to the Lords of the Privy Council in 1848, "the quarantine regulations have for some time past ceased to be enforced;" and in their report to Parliament, they do not hesitate to say that concurrently with this change in sentiment, "particularly during the last twenty-five years, there has been a cautious but gradual relaxation of the stringency of quarantine regulations; an abandonment of them altogether in relation to some diseases to which they were once strictly applied, and a growing doubt whether they really accomplish their object with regard to any diseases whatever."[†]

* An allusion to the apparent inhumanity silently expressed, both in the selection and in the continuance for more than a century, of Standgate creek as a suitable station for a quarantine and lazaretto, is not out of place. In the evidence furnished to Parliament in 1848, in relation to the question of the manner of enforcing quarantine, it is said to be surrounded "by a bare, dreary, swampy country, and a stream abounding in mud," inconvenient and unhealthy, and "one of the districts the most severely visited by epidemic diseases in the country." Alluding to another station and its dangerous and destitute location, the testimony is, that "the apparent want of provision for affording medical assistance to the crews and passengers of vessels under quarantine," is particularly alluded to; and the Board states "that the quarantine grounds on the Hamber, eight miles from Hull, seaward, cannot be visited every day in stormy weather unless by steamers." In case of sickness it would require the revenue cutter's (a quarantine hulk) boat from three to four hours to go and return to Hull for medical assistance; the inspector of the river says: "Under unfavorable circumstances eight or nine hours," and in stormy weather, or "if the wind and tide were against them, they could not come at all."

† Report of Quarantine, p. 4.

In this Western Hemisphere, pestilential diseases were coeval with its settlement by Europeans in 1618. According to Gookin, in his account of the Indians, a pestilence appeared among them seven or eight years before the English arrived at Plymouth. Winthrop, in his journal, refers to the same fact, and mentions a circumstance as to the yellow color of the skin of those who died, from which we may infer that the disease was the American plague, or Yellow Fever.*

It was nearly a century after this outbreak (while in the mean time we have accounts of several pestilences having occurred), before any public legal restraints or safeguards were instituted to prevent or arrest the spread of pestilential or contagious diseases. When these measures were first entertained, following in the footsteps of the mother country, the authorities not only holding the opinion of their exotic origin, but believing in their communicability through the means of contagion, agitated seriously the establishment of preventive measures through the agency of quarantines, and the systems then devised were almost exact copies of those in operation throughout Europe, and the counterpart of those established formerly in the old world against the Oriental plague.†

Pennsylvania was the first in the field to move in the enactment of precautionary laws.

It was towards the close of the 17th century (1699), with a population of only about 4000 souls, when the city of Philadelphia was visited for the first time by a fever, pestilential in its character, and which raged with unusual virulence. It carried off "six, seven, and sometimes eight a day, for several weeks together, there being few if any houses free from sickness."‡ The records of these early days furnish no medical account of this fearful epidemic. The few dis-

* Webster on Pestilence, vol. i. pp. 177, 178.

† La Roche, vol. ii. p. 735.

‡ Thomas Story's Journal, p. 228. Phila. Lib.

tinguished historians and journalists, however, who refer to the pestilence, unite in opinion not only that it was the veritable Yellow Fever, or "Barbadoes Distemper," but, moreover, that it was brought into the colony from the West Indies.*

The same year (1699) brought with it the arrival of William Penn, the Proprietary of the colony, from England, after an absence of fifteen years. This was his second visit to his virgin settlement. He returned, however, to England, in order to protect the interests of his infant colony, after a brief stay of only two years, but long enough to have established numerous important laws, among which was that of quarantine.

The occurrence of that fatal epidemic to which allusion has just been made, its malignant character, its dreadful ravages, with its fearful concomitants, the prevalent opinion at that early day of its importation "in a ship or other sea-vessel from the island of Barbadoes," together with the seeming necessity for some legal arrangements for the future protection of the citizens from the introduction of disease through the channels of a foreign commerce, gave rise, without doubt, to direct legislation, which resulted in the enactment of the first quarantine law in this country.

This is the earliest act in America, to be found on record, having any reference to a system of regulations for the government of sickly vessels. It was done "at a General Assembly began at Newcastle on the 4th day of October, in the twelfth year of the reign of King William III., in the year of our Lord one thousand seven hundred (1700), by William Penn, Esq., Absolute Proprietary and Governor-in-Chief of the provinces of Pennsylvania," is entitled "An Act to prevent Sickly Vessels coming into this Government," and reads as follows :

* Isaac Norris's Letter to Jonathan Dickinson.—*Watson's Annals*.

" *Whereas*, It hath been found, by sad experience, that the coming and arriving of unhealthy vessels at the ports and towns of this province and territories, and the landing of their passengers and goods, before they have lain some time to be purified, have proved very detrimental to the health of the inhabitants of this province: *Be it therefore enacted, by the authority aforesaid*, That, from and after the publication hereof, no unhealthy or sickly vessels, coming from any unhealthy or sickly place whatsoever, shall come nearer than one mile to any of the towns or ports of this province or territories without bills of health; nor shall presume to bring to shore such vessels, nor to land such passengers or their goods at any of the said ports or places, until such time as they shall obtain a license for their landing at Philadelphia, from the Governor and Council, or from any two justices of the peace of any other port or county of this province or territories, under the penalty of ONE HUNDRED POUNDS for every such unhealthy vessel so landing, as aforesaid, to the use of the Proprietary and Governor; and that suitable provision be ordered by the Governor and Council for their reception, if they be permitted to land or come on shore."*

Whether this primitive health law was at once enforced, or whether it remained for a time as a dead letter on the statute-book, is buried in the lost history of these early days of the colony.

The conclusion is, that the law was not immediately enforced, or if so, but very imperfectly, during a period of twenty-seven years after its enactment. The first instance on record in this State, if not in all America, of the detention of a vessel on account of sickness, that has any resemblance to the enforcement of Quarantine laws, was in April, 1728, when two sickly vessels arrived in the river from Bristol, England. One of these vessels being in good condition, was allowed to

* *Laws of Penna.*, P. Miller's ed., chap. lxi. p. 182. *Athenæum*.

enter, but the other had cases of malignant fever on board, and it was "*Ordered*, that the Dorothy come not nearer than one mile to any of the towns or ports of this province; that the master or owners do not presume to land any goods, passengers, or sailors at Philadelphia without license, under the penalty in the said act mentioned; and that the Sheriff serve the said master or owners with a copy of this order; and further, that he be required to provide some convenient place at a distance, for the reception of those persons still sick on board, that proper care may be taken for their recovery."*

Nine days after these timely proceedings, the said ship was "allowed to enter and put on shore the goods and passengers on board; due care being had, that before said vessel come up to Philadelphia, all the bedding be put ashore at a convenient distance from the city, there to be aired, the vessel to be smoked with tobacco and washed with vinegar; the bales of woollen goods on board, to remain some time exposed to the air on deck before landing; and further, that the said ship lay out in the stream of the river and not come near any wharf, till she is sufficiently cleansed."

In 1743 the Colonial Assembly passed an act providing for a lazaretto or hospital for sick passengers arriving in the province, and "to prevent the spreading of infectious distempers." A tract of land was purchased called Fisher's Island, afterwards Province Island, at the junction of the Delaware and Schuylkill Rivers, for this purpose. The Committee or Trustees having it in charge, were directed to lease the Island, reserving six acres for future hospital buildings,† with the understanding, that the present buildings should be used as a hospital for sick emigrants. The law required that the nursing, medicine, maintenance, and other necessities, should be defrayed by the importer. who was to give bonds for the

* Colonial Records, vol. iii. pp. 293-5.

† These buildings were not erected until 1794. The walls are yet standing.

faithful performance of his obligation, and in the event of a failure, he was to be committed to prison *without bail* or *mainprise* until he conformed therewith.

No patient could be discharged from this hospital without a certificate from the physician, concurred in by the Trustees, that he was free from infectious diseases. Among other stringent sections of this act, was one exacting a penalty of ten pounds for harboring any sick person who had been ordered to the pest-house, and compelling persons so offending, not only to take care of them during their sickness, without charge, but in the event of their death, to bury them at their own expense; and, further, if they were unable to pay the fine, they were imprisoned for one month.

About the year 1800, the Board of Health of Philadelphia, having purchase ten acres of ground on Tinicum Island, ten miles below the city, erected thereon suitable buildings for a lazaretto, with ample accommodations, and removed the quarantine from Province Island to Tinicum the present station.

Between the years 1700 and 1765, several changes were made in the original quarantine act by supplements, all having reference to the importation of passengers in too great numbers in any one vessel, and to prevent the spreading of infectious diseases. From this time no further action was taken in regard to quarantine laws until 1774, when a committee of the Assembly was appointed to prepare and introduce a new bill for the protection of the Province from pestilential diseases imported in ships. This bill passed the house, January 22d, 1774, and contains several new features. It exacted a penalty of £100 for bringing a passenger vessel, or one coming from a sickly port, nearer to Philadelphia than Mud Island or Fort Mifflin, without a permit from the health officer, after an examination by the physician. A fine of £100 was also exacted for concealing a sick passenger. Another

provision was, that any sick person escaping from Province Island, and arrested, was required to pay a fine of £50, and if not able, *was to receive any number of lashes, not exceeding twenty, on his bare back, well laid on.*

In 1803, all former laws were repealed by the enacting of health laws, including a Quarantine, at which time a Board of Health was established, to whom was intrusted the government of the lazaretto, together with an oversight of quarantine regulations. This law was both stringent and oppressive. Imprisoning both the sick and the well, the infected and the disinfected, on board their infected vessels or in the hospital; detaining the healthy for many days, and exacting heavy penalties for a violation of the law.

In 1818 this law was modified, and, with but few amendments of any importance, is the one now in existence. It is as follows :

From the 1st of June until the 1st of October, the time to be extended, if the Board deem it necessary, all coasting vessels with foreign goods, or the baggage of foreign passengers, and every vessel from a foreign port, bound to Philadelphia, must come to anchor at the Lazaretto, for a visit from the physician. If said vessels are healthy, clean, without an infected cargo, had no sickness during the voyage home or in a foreign port, and if no malignant or contagious disease prevailed at the port of their departure, they shall proceed to the city. But if otherwise in any of these particulars, they shall be detained, with the crews and passengers, for such time as the Board of Health may direct, not exceeding twenty days.

Every vessel detained by the physician at the lazaretto, is thereby subjected to the will of the Board, which alone is invested with power to release her

Vessels having had on board sickness of a malignant character, during the voyage, or in a foreign port, or while at Quarantine, are subject to further detention, as the Board may

direct; the Board may discharge the cargoes, have the vessels and baggage cleansed, and also keep the passengers and crews within a strict quarantine until the 1st of October.

The act also forbids persons, their baggage, &c., having arrived at any port or place in the United States, from a sickly port, or in any vessel in which malignant disease existed while they were on board, from entering the city or county of Philadelphia, without permission of the Board of Health, or without having performed a quarantine of twenty days.

Heavy penalties are imposed by law for a violation of these quarantine laws.

In presenting this item of history, the Committee believes that it is worthy of preservation, as illustrative of the beginning of a system of quarantine in this country, which, after a long course of years and in consequence of its many useless yet rigid exactions, has become oppressive to those who are obliged to submit to its restrictions, as well as burdensome and injurious to commerce, from the imposition directly and indirectly of heavy taxation, as well as unnecessary delay, by protracting the length of the voyage.

In Massachusetts, legislation upon the subject of Quarantine dates back to a very early period in the last century. In 1701, a partial law was enacted having reference particularly to small-pox, but including protection from other diseases according to the following provision. In the event of vessels arriving in the province being "visited with the plague, small-pox, pestilential or malignant fever, and other contagious sickness during the voyage, or to come from any place where such sickness prevailed, the infection whereof may be communicated to others," the select-men "were empowered to prevent all persons belonging to the ship from coming on shore, or those on shore having any communication with them." This has been the foundation of all the sanitary laws,

passed since that time.* At a subsequent period, not exactly known, says Shattuck, a hospital was erected on Spectacle Island by the town of Boston. In 1736, an arrangement was made by the province, by which Rainsford Island was conveyed to them from certain owners, "to be used and improved for an hospital for the said province" for a permanent quarantine establishment; and some time between this year, 1736, and 1757, a hospital was built, as we find that an act passed in the latter year, commences: "Whereas, a good and convenient house hath been provided at the charge of the province on the island called Rainsford, for the reception of such persons as shall be visited with any contagious sickness." It was not, however, until 1799, that the quarantine regulations were transferred to the Boston Board of Health, which was established by an act of the legislature in June of the same year.

By the revised statutes of 1836, the quarantine hospital on Rainsford Island was placed under the control of the Mayor and Aldermen of Boston. In 1839, so much of this act of 1836 as related to the hospital was repealed. But in 1841, another act was passed granting the island and all its buildings to the city of Boston "for the sole purpose of a quarantine establishment."

In 1843, a joint committee of the City Council and Aldermen of Boston reported in favor of removing the quarantine establishment to Deer Island. This report refers to the change of opinion in regard to the question of contagion, as an argument in favor of its removal to some place more accessible to the city. The report says that the present establishment, owing to its distance from the city, "is rather adapted to a state of things which belonged to other times." "Now," the report continues, "the doctrine concerning contagion has been

* Sanitary Com. of Mass. Rep., p. 50.

within a few years so entirely changed, that almost all quarantine regulations are abandoned, and but little apprehension is felt of the diffusion of any epidemic disease to any considerable extent in the community." But the committee contends, that, owing to public feeling and public necessity, it is neither expedient nor proper, to give up all provisions for the quarantining of vessels, and a convenient place for the removal of individuals in the community laboring under any contagious disease, when residing in a densely crowded neighborhood. And they say: "There must be some place, also, to which vessels arriving in a foul and infected state, or having sick persons on board, can be sent for the purpose of being cleansed, and the sick landed and taken care of."*

In accordance with the recommendation of this report, which was adopted by the City Council and the Board of Aldermen, the island was placed in charge of the Mayor and Aldermen who constitute the Board of Health, to be used for a hospital establishment and the quarantining of vessels in the same manner as at Rainsford Island.

From that period to the present, the location has not been changed, and the chief measures of protection from the introduction and spread of epidemic or infectious diseases, consist in the proper enforcement of the following sanitary precautions.

In 1853, all vessels arriving from ports where Yellow Fever was prevailing, or having cases of the disease on board, were ordered into quarantine, where they were examined, and if found to have any decomposing or fermenting substances, or collections of filth in the cargo, or among the ballast, they were discharged of their cargoes, and cleansed thoroughly; and these sanitary measures were continued until a decided frost occurred. All isolative quarantine was

* City Document, Boston, No. 11, 1843.

avoided. Passengers, and as many of the crew as could be spared, were allowed to land and enter the city with their personal baggage and effects. Permits were to be obtained from the port physicians.

At the present time, the only quarantine regulation in force, applies to vessels arriving with immigrant passengers. They are detained for examination, after which they proceed to the city. If sickness is on board, the sick are sent to the hospital. Vessels arriving with Small-pox or any contagious disease among the crew or passengers, *proceed directly to the city*; application is made at the Custom-house, and all who are entitled to the benefit of the marine hospital fund are removed there.

New York was next found ready to protect her citizens against the importation of disease by the interdiction of all communication with vessels, their cargoes and crews, arriving from foreign ports and suspected of conveying disease by contagion. It was not, however, until 1753 that the colonial legislature took up the subject, and enacted a law, entitled "An act to prevent the bringing in and spreading of infectious distempers in the colony."* The provisions were, that vessels having Small-pox, Yellow Fever, or other contagious distempers on board, should not come nearer the city than Bedlow's Island, there to be quarantined, and heavy penalties were imposed for a violation of the law. This law was substantially re-enacted in 1784 by the State Legislature, seven years after the colony, in conjunction with other States, had declared its independence.

This act, in the language of Judge Birdseye, of the Supreme Court of New York, in 1856, "contains the germ of our present quarantine system; and the provision in section 3, for the appointment of a physician to inspect all vessels which

* Report of Select Com. N. Y. Assembly, 1848, p. 5.

may have on board, or which may be suspected of having on board, any person or persons infected with a contagious distemper, is probably the earliest provision of law in the State for the selection of a person to perform the duties of the present Health Officer of the port of New York."

"This act was amended on the 27th March, 1794,* and by section 5, of the amendatory act, the Governor was authorized to appropriate Governor's Island for the purpose of erecting buildings, &c., for the reception or accommodation of any persons infected with such distemper."†

It does nowhere appear, however, that any lazaretto hospital was ever erected on this island. In 1799, the act was amended, authorizing the purchase of a tract of land on Staten Island, on which was to be erected a hospital to be known as the Marine Hospital, &c., in lieu of the Lazaretto, which had been ordered to be established on Governor's Island. It also provided for the anchorage ground of vessels subject to quarantine.

This act was again amended in 1801, fully establishing a quarantine system in its present location, while many of its original provisions remained substantially the same through all subsequent revisions; thus says Judge Birdseye: "By this act (that of 1801), the Quarantine establishment was reduced to regular system, and endowed with vigorous and efficient powers. It had then been already located where it now is, and the hospital had been erected; doubtless under the authority conferred on the Governor by section 4 of the act of April 1, 1796. It has ever since continued in that location, and has been the object of the constant attention and care of the Legislature. And if the intention of the Legislature may be inferred from their silence, as well as from their enact-

* 3 Greenleaf, 146.

† Opinion of Judge Birdseye, relative to the powers and duties of health, N. Y. p. 7.

ments, this quarantine establishment was deemed amply sufficient to guard the health of the whole State. For until a very recent period, it was, if I mistake not, with the exception of the Boards of Health of New York, Albany, and a few similar places, the only regularly constituted sanitary authority and the only permanent sanitary establishment in the State."

These laws were further revised from year to year until 1857, when the system now in operation was enacted, which is substantially as follows:

"All vessels arriving at this port, between April 1st and November 1st, from infected places, or having on board any pestilential or contagious or infectious disease, shall remain at Quarantine at least thirty days, and twenty after their cargo has been discharged; and are subject to such further quarantine as the Commissioners of Health may prescribe. All other vessels are detained for a visit at the Quarantine, and if found healthy, are permitted up; but if not, are subject to quarantine as the Mayor and Commissioners of Health may direct. Steam vessels with disease on board are subject also to detention, as the Board of Commissioners may order.

"The crews and passengers, with their baggage, of all infected vessels, or those subject to quarantine, are detained for fifteen days after the appearance of the last case of disease, and ten days after their arrival, unless sooner discharged by the Mayor and Health Commissioners.

"The Board of Commissioners of Health—composed of the Mayor, the President of the Board of Aldermen, the President of the Board of Councilmen, the Health Officer, Resident Physician, the Health Commissioner, and City Inspector—have power to forbid all intercourse with infected places, by land or sea, and may quarantine all vessels, crews, passengers, baggage, and cargoes, and apprehend all persons coming into the city from such places, and send them back, or if sick, to the Quarantine hospital.

“Sanitary measures are strictly enforced at Quarantine with vessels, cargoes, baggage, crews, and passengers.

“Heavy penalties are imposed for a violation of any of these laws, and according to an act of April, 1857, vessels may be removed from the wharves of New York or Brooklyn, when the health of the city demands it, to a place of safety, and all infected goods in the city, as well as vessels at Quarantine; the expense of said removal to be at the expense of the owners of said vessels, and to be a lien on them.”

For a number of years past the removal of the Quarantine of New York from its present location, on Staten Island, has been an open question. Formerly its position was an isolated one. Now in the centre of a dense population, all the surrounding circumstances demanded its removal. That such an institution in its near proximity to a large population was dangerous in the extreme, became a popular fear, and was almost universally acknowledged. But one sentiment seemed to pervade the inhabitants of Richmond county, that it must be removed. Two years ago the Legislature was overwhelmed with stirring appeals, invoked by the instinct of self-preservation, demanding its immediate removal. The Government could not resist the arguments presented, and decreed its removal. By an act of the Legislature, passed March 6th, 1857, Commissioners were appointed to remove the “Quarantine station” to some point other than the present one. Seguin’s Point, in Princes Bay, on the western side of Staten Island, was selected; buildings for the accommodation of the sick were in process of erection when the torch of the incendiary was applied, and they were destroyed; a second time they were constructed, and a second time they were reduced to ashes. The influence of the residents of Staten Island again prevailed with the Legislature, and a bill passed for the removal of Quarantine from the Island. Negotiations were entered into with the authorities of New Jersey to cede to her

sister State, New York, a portion of Sandy Hook for a quarantine station. This scheme also failed. Matters and things were now in a far worse condition than before; feelings were exasperated, popular indignation was overwrought—a crisis had arrived—and a high-handed outrage was committed. The State buildings within the Quarantine inclosure in one night's time became a mass of smouldering ruins. Comment would be improper in this place. As a part, and a fearful part, too, of the history of the New York Quarantine, we have barely referred to the transaction, omitting the scenes that were witnessed by the officials.

By an almost unanimous voice, the citizens of Richmond county, Staten Island, have determined upon using every effort to secure the removal of the Quarantine and Marine Hospital from their immediate vicinity. They believe that the present location, in the midst of a dense population, is not only a serious incubus upon their commercial prosperity, but an evil fraught with danger to the health of the entire community. During the present session of the Legislature of New York, another bill, called the "Quarantine Removal Bill," has been reported in the Assembly by the Committee of Commerce. This bill provides for the peremptory removal of the Quarantine from Staten Island, for the erection of hospitals on Coney Island, for the use of seamen and others laboring under contagious and infectious diseases; and until permanent buildings shall be completed, floating hospital accommodations to be provided. Since the destruction of the State buildings, last fall, the Board of Health of New York have removed the anchorage ground for fever vessels lower down the Bay.

At present, the entire subject of a location for the New York Quarantine is an unsettled and embarrassing question. Nor is it likely to be soon determined, unless the Legislature, before its final adjournment, should pass the bill to which allusion has been made.

Floating hospitals or lazarettoes have long been in use in England, nor is it improbable that under existing circumstances they may become an institution connected with a New York Quarantine, and in this arrangement find "the only present solution of the vexed question of Quarantine location, and one which can alike receive the support of New York City and Staten Island."*

The inauguration of a Health Office and Quarantine in New Orleans took place in 1818, by legislative enactment, and is entitled, "An Act to establish a Board of Health and Health Office, and to prevent the introduction of malignant, pestilential, and infectious disease into the city of New Orleans."

This was repealed the next year, 1819.

The third act was passed in 1821. This was very restrictive in its regulations, and was maintained until 1825, when it was repealed through "popular clamor and indignation," the Yellow Fever having prevailed in the city each year, twice in an epidemic form. From that time until 1855, New Orleans was without a quarantine. After the occurrence of the great epidemic of 1853, there was a strong popular feeling in favor of a renewal of quarantine on the ground of the foreign origin and contagiousness of Yellow Fever. The effort was made at the session of the Legislature, in 1854, but the Committee of both Houses to whom the subject was referred, was divided in opinion; two reports were presented, one in favor, and the other opposed to a quarantine, but finally the whole matter failed. In the summer of 1854, Yellow Fever again prevailed with severity in New Orleans, and at the next session, of 1855, a quarantine law was enacted.† In 1856,

* Letter from Richmond County Medical Society, Staten Island, to Commissioners of Emigration, New York.

† In the language of a late writer: "After this long period (of thirty-three years), in which New Orleans had stood forth as an example and beacon for

as the domestic origin of the epidemic of Yellow Fever of the preceding year scarcely admitted of a doubt, and as the expense and inconvenience of maintaining a quarantine was considered a great incumbrance, a strong effort was made to have the law repealed, but without success. It is still enforced at the station about seventy miles below the city, in accordance with the following regulations: The quarantine being under the direction of the Board of Health, who derive their commission from the Governor for one year. All vessels, with their cargoes, passengers and crews, arriving from any place or port which has been declared by the Governor, upon the advice of the Board of Health and resident physicians, to be infected, shall be quarantined during such period as the Governor in his proclamation shall require; and all foul vessel

the guidance of other cities, as the champion of her own best interests, the memorable epidemic of 1853 is ushered in. This has been called the *great epidemic*."

In the following winter a quarantine law was re-enacted. On the disappearance of this epidemic, according to the same writer, a Sanitary Commission was selected, for ability and learning, to investigate the causes of this epidemic. Among other subjects referred to the Commission, was the following: "To inquire into the origin and mode of transmission or propagation of the late epidemic." The gentlemen to whom this question was assigned, reported, "that the epidemic was clearly and unequivocally of local origin," and a majority of the Commission declared that, not "satisfied with theoretical presumptive evidence," by a most careful scrutiny of every circumstance connected with its occurrence, they had "converted presumptive proof into positive certainty, that the Fever originated" in New Orleans, and was of local origin. Two of this Commission did not subscribe to this "positive certainty," but believed in its importation, and were in favor of the establishment of "some kind of quarantine." One of these gentlemen, Dr. Simonds, published some time previously in Fenner's *Southern Medical Reports*, a statistical article of the Yellow Fever as it appeared in Charity Hospital, "which is of itself sufficient to demonstrate the local and indigenous origin of Yellow Fever, and to overthrow the whole fabric of quarantine which he now advocates." He has therein shown from the records of that institution, that for thirty consecutive years, setting out from 1820, there is no one year in which there had not been cases of Yellow Fever in the Charity Hospital.—M. M. DOWLER, M.D., *N. O. Med. and Surg. Journ.*, vol. xvi. p. 222.

or vessels, having on board cases of Cholera, Yellow Fever, pestilential, contagious, or infectious diseases, shall be detained at the Quarantine not less than ten days, and such other time as the resident physician may deem necessary; the sick are then landed and placed in the hospital, the vessel to be cleansed and fumigated, and the captain compelled to submit to such other rules as the Board of Health may adopt. From the 1st of May to the 1st of November all tow-boats plying between the mouth of the river and New Orleans, shall be liable to inspection and quarantine, and shall not be admitted to the city without the certificate of the quarantine physician, which shall not be granted before a detention of five days.

No intercourse with vessels at quarantine is allowed without permission of the Quarantine physician.

Heavy penalties are exacted for a violation of any of the quarantine laws.

The location of the quarantine ground is fixed by law at a distance not less than seventy miles below the city of New Orleans on the Mississippi River.

In several other large cities on our sea-board, quarantine regulations, either municipal or legislative, have been instituted, more or less restrictive in their character, according to their locality or to the views entertained by the authorities under whose administration they were adopted. These sanitary restrictions were originally established upon the theory of the contagious character of epidemic or pestilential fevers, and were designed especially to prevent the importation of disease in vessels from infected places.

While they differed materially in the uniformity of their regulations—as to discrimination in the detention of vessels, extent of sanitary measures to be observed and the severity of the isolation to be enforced—they are all without an exception modeled upon those laws established in the several

larger cities of the United States at an earlier period, to which particular reference has already been made.

Such is a slight, and, we are fully sensible, an imperfect sketch of the history of quarantine in Europe and this country. Had it been necessary, and had the leisure of the members of the Committee permitted, a fuller and more detailed survey of the subject might have been undertaken. Enough, it is trusted, has been stated to show that intention has everywhere been called to the necessity of adopting means to prevent the introduction, and arrest or moderate the spread, of contagious and pestilential diseases. It will be seen from what precedes, that while, in this country, those means are for the most part limited—even as regards the Yellow Fever and Cholera—to those that come within the category of quarantine measures; while, also, it might be shown that other measures which come more strictly within the range of local hygienic regulations, are sadly neglected—nay, often totally overlooked—or made subservient to those of the former class; while, we say, this is found to be the case in this country, and the tendency is evinced in several places to establishing quarantines, where they did not exist before, against those diseases—the only ones of the kind against which we have to contend—to re-establish them when they had been abandoned as useless and inefficient, and to render them more stringent and vexatious than they were before, each place adopting a code of its own, and thereby aiding in the production of confusion—we find that in some parts of Europe, where the enactment of sanitary regulations is usually, if not always, intrusted to competent hands, a gradual diminution in the severity of Quarantine laws has taken place; that almost everywhere the absolute necessity of enforcing strictly, and without intermission, an observance of hygienic measures, that in some places the highest professional authorities have not hesitated to recommend a repeal of all quarantine laws—so far,

at least, as concerns the Oriental Plague, the Yellow Fever, and the Asiatic Cholera—and an exclusive reliance on measures of a strictly hygienic character, in other words, which have for their object the prevention or suppression of those local conditions, without which the diseases mentioned cannot, whatever be the nature or origin of their efficient causes, exist, and that in many more the propriety of doing away with quarantines, as regards Cholera, has been fully recognized and acted upon.

Of the truth of these remarks, the history of quarantines in Europe during the last half-century, affords ample and satisfactory proofs. For it will be found that everywhere superannuated practices, onerous to commerce and navigation, and vexatious to individuals concerned, have been abolished; that the duration of quarantines has generally been greatly reduced, especially in France; and, as remarked by an intelligent writer (Tardieu), if we still discover among the existing sanitary regulations many inconsistent clauses, many regulations at variance with the present state of knowledge, and which nothing serves to justify, it must be borne in mind, that science does not alone prevail in the preparation of these regulations, and that while the public authorities charged with this duty have not failed to avail themselves of the advice and assistance of intelligent, experienced, and learned professional men, they could not overlook the necessity of taking into account the popular prejudices existing on the subject, as well as commercial interests, which not unfrequently are as greatly injured by a too sudden reduction of quarantine restriction, as by an undue extension of them.

Still further to ameliorate the quarantine regulations in force, and place them on a level with the existing improved state of knowledge relative to the nature, origin, and mode of progression of pestilential diseases, as also to obtain, if possible, the adoption, in various parts of Europe, of a uniform

code of quarantine and sanitary laws calculated to lessen, if not remove, some of the difficulties to which allusion has just been made, the French government, not content with having greatly modified its own code in the way mentioned, proposed, at the instigation of some of her scientific men, to all the governments having common interests in the Mediterranean, the formation of a Sanitary Congress or Conference, charged with the preparation of a code of international sanitary regulations. A draft of a code suggested as the basis of discussion, drawn up by an eminent physician and member of the Consulting Committee of Public Hygiene of France, was submitted to each of those governments and approved. The Congress, consisting of delegates from France, Austria, the two Sicilies, Spain, the Roman States, Great Britain, Greece, Portugal, Russia, Sardinia, Tuscany, and Turkey, assembled in Paris in 1851 and 1852, and, after a lengthened discussion, adopted a code, which, being referred to the governments of those several countries, awaits their approval before becoming a law. This code has been ratified by France and Sardinia in May and June, 1853.

II. HAVE QUARANTINES SECURED THE OBJECT FOR WHICH THEY WERE ORIGINALLY INTENDED? IF NOT, THE REASONS OF THEIR FAILURE.

In a careful examination of the few and imperfect historical data in our possession in respect to the nature and object of quarantine at the period of its introduction, it may be safely inferred, the Committee believes, that, at first, quarantine consisted in an absolute prohibition to the landing of all persons, clothing, baggage, and merchandise from vessels, in consequence of their having come from a place at which some contagious or infectious disease prevailed at the time of their departure, or of their being brought in ships on board of which such disease was actually existing at the period of their arrival, were

judged to be capable of introducing the same among the inhabitants of the port at which the ship stops or at which her voyage is to terminate; the prohibition being enforced by barriers, guard-boats, or sanitary cordons. How far, during the early period of quarantine, the measures adopted to prevent the introduction of the diseases against which they were directed may have been successful, we have no means of determining. Their success would depend, in a great measure, upon the true character and etiology of the diseases included in the category of contagious and infectious; upon the skillfulness and fidelity with which intercourse with actually infected persons, vessels, and goods, was cut off, and the length of time during which such non-intercourse was enforced, as well as upon the efficiency of the measures pursued for the purpose of freeing the holds of the vessels of any morbid atmosphere, or of disinfecting all fomites removed from on board of such vessels, or contained in their cargoes, or among the clothing and effects of quarantined seamen, passengers, or travelers, of their contagious miasma.

There can be but little doubt, the Committee thinks, that a strict quarantine of infected persons, for the longest period the incubative stage of any contagious disease is known to last, and a thorough purification of all infected vessels, clothing, effects, and merchandise, are measures well adapted to prevent the introduction from without, of all positively contagious diseases, and, to a certain extent, it may be of those, also, which, though confessedly non-contagious, may nevertheless be produced in persons breathing the morbid atmosphere generated on board of filthy, leaky, crowded, and ill-ventilated vessels, recently arrived, especially during a season of intense heat, or one which has, from any cause, become particularly unhealthy.

If quarantine, however, be made to consist simply in the prohibition for a definite period of time, of the entrance of in-

fectu ships, persons, or merchandise, into a place, without any measures being instituted for the purification of the prohibited ships, with all the persons and things on board them, it will most certainly prove ineffectual as a means of excluding even those diseases which are capable of being transmitted by contagion alone. And as we know that many of the older systems of quarantine aimed at the exclusion of disease, by simply isolating for a certain number of days, such vessels, persons, and things, as were supposed capable of conveying it, without any attempt being made to purify the infected vessels, their crews and cargoes, we can readily infer that those systems must have signally failed in securing the object for which they were instituted.

Quarantine measures, no matter how judicious in themselves, or how prudently and strictly they may be carried out, have been heretofore, and ever will be in the future, altogether ineffectual as a certain and absolute means for excluding those diseases which, at longer or shorter intervals, make their appearance under the character of wide extended epidemics, or which prevail as endemics in particular localities, under certain meteorological, telluric, and sanitary conditions, of regular or occasional occurrence.

In the very face of, apparently, the most impassable barrier, of the best devised guards, the most vigilant and extended sanitary cordons—of all the securities that wisdom could devise or untiring zeal and industry could carry into execution—epidemic diseases have, it is well known, invaded community after community, while, on the other hand, they have entirely spared others, in their immediate route, where not the slightest precautionary measures had been adopted in the hopes of keeping them out. This fact is proved by the entire history of endemic cholera, from its first outbreak in 1832, down to the present time. This disease, together with Yellow Fever, Typhus and Typhoid Fevers, etc., will as certainly occur in

those places in which their causes have become developed to a sufficient extent, under the strictest system of quarantine, as they will in the absence of all quarantine.

But while the Committee asserts—what the history of all epidemic and all endemic malarial diseases proves incontestably—that against such diseases quarantine must ever prove an ineffectual barrier, it would by no means be understood as inculcating the doctrine of the utter worthlessness of such preventive measures under all circumstances. To discard them entirely would be equally as improper and dangerous as to rely on them for that degree of protection they are incompetent to yield. A judicious and well-administered quarantine will, beyond doubt, afford a very sure protection against the introduction of unquestionably contagious diseases, as Small-pox, for instance; and even to a limited extent, and under particular circumstances, against the introduction of such as are the result of malaria—using the latter term in its general sense as indicated by its etymology. Nor is the Committee prepared to say that a vessel may not arrive with an amount of infectious atmosphere in her hold, sufficient to produce under all other circumstances favorable to the development of one or other disease—Yellow Fever, or Cholera, or Typhoid or Typhus Fever, in such as come within the sphere of its influence, and if several vessels similarly circumstanced shall arrive at the same time, or within a short period of each other, there is no calculating to what extent they may become the means of propagating one or other of the diseases named among the community: and this, too, without a single case of death or of disease having occurred on board of such vessels, and without their having come from or touched at an infected port.

One of the frequent causes of the failure of quarantines to secure the object for which they were originally instituted, is, that the necessity of their enforcement has been based upon

the supposition that the danger of the introduction of disease is attached solely to vessels coming from places at which a malignant malady was prevailing at the time of their departure. The fact being overlooked that a ship that has arrived direct from a perfectly healthy place, may have had disease generated on board of her from a variety of causes of very ready occurrence, or, if not actual disease, a foul state of atmosphere capable of infecting all who breathe it, and which has remained, as it were, innocuous, until the hold of the vessel has been thrown open preparatory to the discharge of her cargo. It is the erroneous supposition referred to which originated the regulation by which all vessels about to sail from certain ports, especially during what was termed the sickly season, were required to procure "bills of health;" that is to say, certificates issued by certain recognized authorities—either the health officers of the place, or the accredited consuls of the respective nations to which the vessels are bound—setting forth the true condition of the port in respect to the presence or absence of any malignant, contagious or infectious disease. These bills or certificates of health being denominated "clean" or "foul," according as they bear testimony to the healthy or unhealthy condition of the port at which they are issued.

Were every vessel, with every person and thing on board arriving from an infected port, to be subject to the strictest and best conducted quarantine, and to the most thorough purification, still there would be no certainty of the exclusion of the most virulent and loathsome diseases, of the very class, too, against which a judicious quarantine is adapted to afford the most certain and effectual barrier, so long as all other vessels are allowed to escape its requirements. Under a wise and well-administered system of quarantine and commercial hygiene, the condition of the place, in respect to health, from whence a vessel comes, is a subject of only secondary import-

ance. The question of detention and purification in each case should be determined from the actual condition of the vessel and her company, ascertained by a full, careful, deliberate, and systematic examination, executed by well-instructed experts, at such a place, and under such regulations, as shall preclude the possibility of her communicating disease, should she prove to be foul or infected.

No importance whatever should be placed upon the fact of a vessel not bringing a clean bill of health. Even could such a document ever become, under ordinary circumstances, a safe guide in deciding upon the proceedings, or in rendering more accurate the conclusions of the examining officers, its correctness is seldom to be relied on. It is usually issued as a matter of course, rather than as a true and faithful exhibit of the actual sanitary condition of the place of which it professes to testify. There are, it is suspected, few officers of health or commercial consuls, in any port, who would venture to withhold a clean bill of health, even during the actual prevalence of disease around and about them, until the fact of the existence of such disease became so notorious, as to render the authorities of every other port as fully informed in respect to it, as they are to whom the granting of bills of health is intrusted.

So long as no other results are expected to accrue from the establishment of quarantine regulations than such as they are adequate to produce, they will—provided always their provisions are founded in wisdom, and well and truly carried out—prove useful prophylactic agents, preventing with great certainty the introduction of all positively contagious diseases from abroad, and of guarding, to a very great extent, against the danger of commerce and trade, foreign or domestic intercourse, immigration or emigration becoming, under any circumstances, the means of producing or of propagating disease. But the moment quarantine is relied upon—independent alto-

gether of an enlightened and comprehensive system of internal hygiene, constantly and effectually enforced, and embracing not merely the sanitary condition of the wharves and docks, the quarters of the city devoted to the purposes of commerce and of trade, and those occupied by the residences of the opulent, but the quarters also occupied by the work-shop of the mechanic and the domiciles of the poor—not merely to the proper sanitary condition of the public streets and thoroughfares, and squares, but to that also of all buildings and their appurtenances, store-houses, work-shops, and lodging-houses; of public halls, as well as of the private residences of all classes—so soon, we repeat, as a system of quarantine regulations, without proper internal sanitary measures, is trusted to as a means of preserving a community from disease, it will become a source of bitter disappointment, and will not even afford those beneficial results which cannot fail to flow from it when it is confined within its proper sphere, and intrusted only with that amount of prophylactic agency for which it is adapted

An ill-advised and badly-administered system of quarantine, not only proves a useless interference with the commerce and intercourse of nations, but is calculated to inflict upon those who are made more immediately to feel its restrictions, positive evils of a very grave character. Thus, on the one hand, by an unwise selection of the place at which infected vessels are detained, or where the necessary hospital and other buildings are located, or where improper plans are pursued in respect to the vessels so detained, or in the management of the hospitals and lodging-houses for the reception, whether sick or healthy, of their crews and passengers, the quarantine and lazaretto stations may be rendered fruitful sources of disease, and of an infected atmosphere, the deleterious influence of which can scarcely be confined within their limits. On the other hand, a community pent up by a too

restrictive system of quarantine, within the bounds of an unhealthy city—more especially during an epidemic season, and subject to the privations and the depression of feeling, incident to a trammelled commerce and to the stagnation of almost every branch of industry, the result of the operation of the very measures enforced under the pretext of their affording them a certain protection against some dreaded epidemic which is ravaging, at the time, wide extents of country, and is still constantly spreading in every direction—may be rendered more certainly the victims of that epidemic, and at an earlier date, and to a much greater extent than had no quarantine whatever existed.

The Committee would not, however, urge these evils—the occurrence of which, as the direct results of an unwise system of quarantine, is proved by fact upon fact, and recorded in the annals of medicine—as an argument in favor of the abolition of every form and degree of such preventive measures, but only of that scheme which proposes by a system of non-intercourse to guard the community against the introduction from without of a disease, the seeds of which already exist in its midst, or which may at any moment be borne to it upon the wings of the wind, defying every human effort that is made to bar its entrance.

That quarantines have failed to secure, and for the reasons already stated, the object for which they were originally instituted, is proved by a mass of evidence far too voluminous to be introduced in this report.

During three centuries, from the period of their introduction, the most rigid and oppressively severe quarantine regulations were in force. In their early history in Italy, we find them carried out with a fanaticism corresponding with the spirit of the age; and yet according to Hecker, the plague raged throughout the Italian ports with unprecedented severity. In later years, in our own country, notwithstanding the enforce-

ment of a strict system of quarantine, our principal cities have been more than once nearly desolated by the American plague—the Yellow Fever.

To prove the inefficacy of quarantines as a protection against epidemic and endemic fevers, no other testimony need be adduced than that of some of the warmest and most distinguished advocates for their enforcement.

Dr. Patrick Russell, one of the ablest writers on the plague, and a firm believer in its contagion, and who exerted all his energies to prove that the only means to arrest its progress were quarantine regulations, has the candor to admit that such regulations have often proved ineffectual. "Plague," he says, "has frequently occurred insidiously when quarantines have been rigidly enforced; and in a more extraordinary manner has often ceased when they have been entirely relaxed." Again, he does not hesitate to use the following language, while vindicating their claims: "Quarantine establishments are certainly a heavy tax on commerce, and the benefit they promise to the State is very precarious, while the detriment to the merchant is real."

Hancock, in his valuable work on the laws of contagion, and a firm believer also in the contagion of the plague, expresses in very decided terms, his doubts as to the entire security afforded by quarantines. He remarks: "It is high time we should know whether they be essential or otherwise; whether they be not a mere form, and whether it would not be safer to dispense with them entirely, than to rely for security on burdensome regulations, defectively administered, and which oppress while they deceive."

At a much earlier period, when scarcely a doubt existed as to the importation and contagiousness of plague—during the great epidemic of 1348, according to the testimony of Boccaccio, as quoted by Russell, both of whom were believers in the prevalent doctrines—the city of Florence was placed under

quarantine, but he says: "No prudence nor human precaution could prevent the contagion (disease?) from spreading."^{*}

It was during this same epidemic of 1348 in England, that the plague made its appearance at Gloucester, notwithstanding the most rigid quarantine regulations were in force

At Marseilles, in 1720, there existed a rigorous quarantine, and all vessels from the Levant were strictly isolated for forty days, the plague being then prevalent in Sidon, Tripoli, and Leghorn. But the disease made its appearance in the city, and destroyed fifty thousand of its inhabitants. It was ascribed to importation through a vessel from Sidon. Nevertheless, Chicoyneau, Deidier, Pons, Robert, and other writers on the disease, have endeavored to prove that it existed in the place before the arrival of the infected vessel at the lazaretto,† and progressed and disappeared in accordance with laws which govern non-contagious epidemic diseases. Quarantine regulations of the most stringent character were at the same time established at Toulon, Aix, Salon, and other places, and yet the disease broke out there and caused a great loss of life.

During the sixteenth and seventeenth centuries, Great Britain was several times visited by the plague, and yet during all that period, quarantines and lazarettoes were in force, and strenuous efforts made by proclamation and other means, to secure their rigid observance, yet they failed of success.‡

Another instance of failure is recorded by Hecker, which occurred at Venice, Italy, in 1485. It was at a time when Milan was being scourged with the plague. A special Council of Health was organized at Venice, and a stringent quarantine enforced to prevent the entrance of disease into that city, but without success, for in a short time the epidemic made its appearance and swept off many of its inhabitants.§

^{*} Russell on Plague, p. 329.

‡ Ibid. p. 478.

† Ibid. pp. 217 and 234.

§ Hecker, p. 59.

A remarkable instance of the inutility of quarantines in preserving cities from epidemics, is that of the advent of the plague in Messina in 1743. A vessel arrived in March from the Morea, the captain and one seaman having died on the voyage, of the plague, the remainder of the crew were placed under a vigorous quarantine, and the ship and cargo destroyed. The alarm subsided. Nothing occurred until the 15th of May, when during a Te Deum in the cathedral for a happy deliverance from the pestilence, a physician in the assembly announced publicly that the disease was at that very time in the city. The clamor of the incensed populace arose to such a pitch against the physician, in consequence of his unwelcome announcement, that his life was in danger, and he had to flee to a convent for safety. In the beginning of June, however, the deaths had increased daily to such an extent, that the government was obliged to acknowledge the existence of the plague in the city; alarm ensued, followed by a dreadful mortality, notwithstanding the enforcement of rigid quarantine regulations.*

One of the most remarkable instances on record of the inefficiency of quarantine laws, is that of the occurrence of Yellow Fever at Tortosa in Spain, in 1821. The most rigid restrictions had been enforced for a considerable time, not only before any apprehension of contagion was proclaimed by the Juntas of Barcelona, but before any suspected cases of disease or any death had taken place in Tortosa, and "yet no place was ever more afflicted than that unfortunate city."†

In 1816 the government of Martinique, one of the Windward Islands, established a strict quarantine in reference to vessels from Gaudaloupe, where the Yellow Fever was prevailing extensively in the city of Point à Petre, "nevertheless the fever broke out and raged extensively."‡

* Russell, p. 514.

† Maclean, *Evils of Quarantine*, p. 162.

‡ La Roche, vol. ii. p. 741.

In our own country, similar results have proved the inutility of quarantine regulations. In no instance can it be shown that they have ever preserved any portion of the United States from an epidemic of Yellow Fever, and every medical reader knows that so far as relates to cholera, they have failed as completely here, as they have done in Europe and everywhere else.

In Philadelphia, the health laws were very imperfectly administered, and quarantine regulations of a very indefinite character from 1700 to 1794. Nevertheless, there were only four visitations of fever in all that long series of years, although a large commercial intercourse was maintained, during the greater part of the time, with the West Indies, where Yellow Fever prevailed annually. But, in the winter of 1794, immediately after a severe occurrence of Yellow Fever, which will ever render memorable the year 1793, a most rigid system of quarantine restrictions was enacted, and vigorously carried out; and yet from that year until 1820, no less than eight several times did the fever prevail with more or less violence. Well may it be said by an American writer, that, "in no place has the failure of quarantine in excluding Yellow Fever been more notoriously exhibited than in Philadelphia." At a still later period it will be found that, although quarantine regulations were regularly enforced in the port of Philadelphia, the Yellow Fever again made its appearance in 1853 and 1854, and prevailed to some extent.

What has been the experience of New York City in reference to the efficiency of a strict enforcement of quarantine regulations? Its history in regard to Yellow Fever confirms the statement, that they are inefficient as a means of keeping out disease.

The establishment of the first quarantine in that city took place in 1758;* since which period, Yellow Fever has made

* For a correction of this statement, and that of the preceding paragraph, see remarks of Dr. Griscom in the debates, p. 78

its appearance there in no fewer than sixteen different years, during which, quarantine was faithfully maintained. As to its degree of prevalence, or whether it occurred as a sporadic or epidemic malady, it is unnecessary to inquire. The existence of the fever is not denied; and allowing the theory advanced by one of her own citizens to be correct, namely, that the disease in all these instances was introduced by foreign vessels or their cargoes, it only goes to strengthen the conclusion that quarantine regulations have not secured the object for which they were originally instituted.

On the subject of quarantines, Dr. Fenner, of New Orleans, in 1849, in his report to the American Medical Association,* uses this language: "As for the old delusion, that Yellow Fever is brought into New Orleans from the West Indies, Vera Cruz, or any other place, and might be kept away by quarantines, I need only say that the experiment has long since been fairly tried and signally failed." In another place he says: "It has been said that the quarantines of 1818 and 1821 were not rigidly enforced. On the contrary, I have heard that they were most rigidly enforced, and only abandoned when they were found to be utterly useless."

The truth is, as experience has fully shown, Yellow Fever bids defiance to all restrictive measures at New Orleans. "Indeed it has been found in that city, that the appearance and prevalence of the fever are not influenced by the enforcement of quarantine laws." "It has prevailed there when those laws existed, and when they were rigidly enforced; it has prevailed even during the war, when, for the want of arrivals, no quarantine could be required, and it has failed to prevail, at periods when no restriction was placed on the intercourse with infected places in the West Indies and elsewhere, either by war, embargo, or quarantine."†

* See Transactions, p. 625.

† La Roche, vol. ii. p. 542.

The operation of quarantines in the towns along the Mississippi, has been equally unsuccessful as in other places.

In 1819, when it became known that the Yellow Fever was prevailing at New Orleans, the authorities of Natchez established a strict quarantine, which was rigidly enforced. It did not secure the object. Yellow Fever prevailed in the city. Year after year it continued to make its appearance, and in 1823 the quarantine was abandoned as a useless encumbrance. In 1841 it was again enforced, but every year from that time until 1849, says Dr. Fenner, "a period of eight years, scarcely a year has passed without presenting a few cases of Yellow Fever, and in some a considerable number." Again, "in 1855," says the same writer,* "there was a rigid quarantine enforced at Natchez against boats and passengers from infected ports, and armed guards stationed on the roads leading to the city, as well as a secret police to detect any infractions of the law;" yet notwithstanding all these precautions, the Fever made its appearance.

At Vicksburgh quarantine was established in 1841, but up to 1853, it was attended with no better success than at Natchez.

The Mobile authorities enforced a quarantine "in 1854 as stringently as the purest contagionist could well desire, and yet the disease broke out and prevailed to some extent."†

In 1805, Dr. Miller, of New York, expressed his opinion as to the want of efficiency in quarantine regulations, in this wise: "The experience of quarantine in the United States speaks little in its favor; for although during the last ten years it has been scrupulously in force in several ports, we have heard ten times more of imported contagion and its ravages at these very ports during that short period, than for

* Trans. American Medical Association, vol. ix. p. 644.

† La Roche, vol. ii. p. 542.

a hundred years before, when no quarantine was in existence."^{*}

Dr. R. E. Griffiths, of Philadelphia, in 1827, while reviewing the quarantine regulations of the United States, gave to the world the following sensible views, which since that period have ripened into a popularity that bids fair in the present state of sanitary science, and the laws of epidemics, to become universal:

"All our quarantine regulations are founded on the assumption that epidemic diseases are dependent on a specific contagion, and hence are intended to prevent the importation of a virus, but it must be admitted by the most strenuous adherent of the doctrine, that they are extremely deficient in their operation, and are not capable of fulfilling the intentions for which they were instituted."[†]

In the *British and Foreign Medico-Chirurgical Review*, there appears a communication by Dr. Charlton, a thoroughgoing contagionist, as his entire article evinces, on the importance of separating the sick from the healthy in cholera, and the necessity for a well-conducted sanitary reform, together with his opinion of the utter worthlessness of all quarantine measures to keep out contagious diseases. After a pointed allusion to the necessity for sanitary regulations in the city, and the separation of the sick from the well, he continues:

"Should we then have recourse to quarantine regulations for the protection of our coasts? *We think not.* Quarantine in a country so dependent for its prosperity upon its foreign trade, is, in our opinion, a greater evil than the cholera itself. To be of any avail, such a quarantine involves an almost absolute cessation of intercourse with infected countries; no loophole must be left whereby the disease might creep in amongst us. Is there any one who believes that this is

* See Miller, pp. 115, 166.

† American Jour. Med. Sciences, vol. i. p. 163.

practicable? Is there any person who will maintain, that by the most stringent penal enactments, we can effectually isolate England from the rest of the world? And if we cannot accomplish this, then our imperfect measures of restriction will be infinitely more prejudicial than no quarantine regulations at all."

Here we have the conviction of a well known modern contagionist, on two essential points in connection with this subject. Although written with a direct reference to cholera, which is assumed by him to be a contagious disease, and of foreign origin, still the sentiment holds good in the case of Yellow Fever or any other pestilential epidemic.

In the first place, he indirectly, if not distinctly concedes, that cholera was introduced into Sweden through the failure of quarantine regulations and the neglect of an internal sanitary police—he is reviewing Dr. Berg's work on Cholera in Sweden—thus substantially confirming the views of the Committee, as to the inefficacy of quarantine under such circumstances. In the second place, he discusses, with great pertinacity, the entire impracticability of keeping out cases of foreign disease from a commercial city.

One of the signers of this report, in his work on Yellow Fever, amid the multiplicity of texts which he has carefully examined, does not pass by this subject with indifference. He considers quarantines a failure, because, as regards contagion, they allure while they deceive; "they substitute false for real securities, for while aiming at effecting that which cannot be obtained, measures proper to prevent the outbreak of the disease are often, and in many places, generally neglected, and as is well remarked by a judicious writer,* they take away the most powerful motive for watchfulness, when they declare that there is no danger of the appearance of the disease,

* North Am. Review, x. 411.

so long as the avenues of its importation are effectually closed. True, some advocates for contagion enjoin attention to measures of cleanliness and purification. But let it be remembered, that the number of places where attention is paid to these hygienic measures is but limited, that it not unfrequently happens, that while quarantines are strictly enforced, those measures are little thought of, and that the danger of importation, in the only mode it can take place, is left unguarded against, for the simple reason that no one sick with the fever, and capable as it is thought of introducing the disease, has been found on board or has died during the passage, or because the vessel has not sailed from an infected port."*

Indications of an approaching epidemic, in the character of premonitory symptoms or significant signs to be observed in communities, are among the reasons why quarantines have failed in their purpose. These manifestations go to prove that there is an epidemic constitution of the atmosphere which not only disorders the health of human beings, but of animals: and also that the vegetable kingdom has been affected before the epidemic is recognized in its peculiar form. This was noticed by Sydenham, by Southwood Smith, and others.

This was remarkably the case in England, six months before the appearance of cholera, and of course prior to the erection of specific quarantine barriers.

It was noticed by Dr. Gregson, at Alexandria, Egypt, in 1836, that cattle were attacked with a disease, which was pronounced to be plague, some time before the disease broke out among the inhabitants.

The coincidence of blight with pestilence has also been observed from ancient times; and the wide-spread potato disease of modern date has likewise been considered as a forerunner of epidemic cholera.†

* La Roche on Yellow Fever, vol ii. p. 738.

† Report on Quarantine, p. 14.

Quarantines have failed, because, in carrying out the various systems which have been adopted during the last three centuries, the principle now so generally acknowledged and taught, of the existence of an epidemic atmosphere, has been entirely lost sight of by those who have attributed to them alone a preservative influence. Hence, if the existence of epidemic diseases depends upon the prevalence of an epidemic atmosphere, the inutility of quarantines is well shown, for "quarantine can exercise no more control over this epidemic atmosphere, than over the electricity and temperature of the common atmosphere, and the direction and force of the wind."*

In proof of the inefficiency of a stringent quarantine to protect a commercial city from disease, the testimony of the late Physician-in-chief of the Marine Hospital on Staten Island, before a recent committee of the New York Legislature, appointed to investigate the health department of New York City cannot be withheld. In answer to a question as to the location of the Quarantine and its danger to the public health, Dr. E. Harris, replied: "It were well for the sanitary interests of the city of New York, if to-day the whole quarantine system were entirely abolished." Again, "There has never been a quarantine system devised in the world, either against plague, small-pox, or yellow fever, that has been so certain in its operations, or the rules and regulations of which have so provided against the possible spread of disease, that after all, with the utmost stringency in the execution of any given code of regulations, there has not been a liability to the spread of the disease.—In my opinion, if the present quarantine system were entirely abolished, a new sanitary system would grow up, and it would be one which would remove, in a great measure, all the embarrassments which commerce experiences from the existing system, and which would protect the city. The external and internal sanitary police should work together."

* Report on Quarantine, p. 59.

He further says: "I regard the quarantine system, generally, as sources of great evil to the cities and places that they are created to protect. They create a false issue in the public mind in respect to the actual sources of danger.— When people become considerably excited upon the subject of quarantine, and when there is a good show of stringency with regard to the restrictions and regulations of quarantine, the people become easy; they think they are protected."

It is known that this gentleman believes in the importation of yellow fever, and that he offered these arguments for the purpose of showing the danger to the city from the present position of the Quarantine ground; nevertheless, he fully substantiates the position of the Committee as to the inefficacy of quarantines, and their failure in preventing the introduction of disease into the city.

Before this same Committee, Dr. James R. Wood testified as to the present inferior health of New York City, and charged as one of the external causes for this state of things, "the importation of disease. We know," he goes on to say, "that we have what is called a quarantine, which, in my judgment, is nothing more than a place where disease and contagion are concentrated."

Dr. D. Meredith Reese also furnished the following evidence to the Committee:

"The present quarantine system has proved itself so utterly inefficient and mischievous, that an entire revolution is called for by all classes of our citizens, and especially by our shipping and commercial men, who are the most severe sufferers, by the severe and worthless restrictions of an old and obsolete system, which is throughout a burlesque on sanitary science." In the same examination, Dr. Reese denounces the New York quarantine laws not only as imbecile, but more tyrannical and oppressive, than any free country or city on the globe attempts to enforce, and "directly opposed to the teachings of experience and to all enlightened science."

The Committee has introduced this testimony of the several New York physicians, to show the little reliance they place upon their own quarantine regulations, which, in the language of one of these gentlemen, are far more rigid, amounting even to oppression, than those of any other city in this country, and also to present the earnest desires they cherish for a reform. Dr. Harris does not fear to say: "It is high time that a more rational and just external sanitary system were provided for the port of New York; it needs to be more directly connected with the internal or civic sanitary system. But the safety of the city, as well as the great interests of commerce, demand that our quarantine system be entirely *recast* and revised, and that the necessarily restrictive regulations of this, our external sanitary system, be so simplified and so intelligently and honestly administered, that the temptations to evasion of the laws be greatly diminished, and the rights and interests of commerce shall be justly guarded; while the health of the city may actually be insured against exotic pestilence. All this will be effectually accomplished whenever the city and port of New York establishes a rational sanitary system, upon the reliable basis of science and sound medical experience."

There can be no hesitation in adopting these conclusions of Dr. Harris, without stopping to inquire as to the particular premises on which they were based.

The necessity for a complete revision—a recasting of our entire system of quarantine laws—is universally acknowledged; nor in the progress of this reform, should the essential alliance between external and internal hygiene, become a mooted or an arbitrary question.

It must be admitted that any approved system of prophylactic measures, or any well-ordered code of sanitary laws enacted for the protection and preservation of the public health, cannot fail to prove equally as well adapted to secure both

objects, provided such regulations are directed to the removal of both foreign and domestic morbid causes. Dr. Wragg,* in alluding to this subject, admits that there can scarcely be any difference of opinion, as to the means most likely to be efficient in expelling or excluding pestilential diseases from communities. He says: "If asked the question, Which of the two systems is most conducive to the public health? I should be disposed to avoid a direct reply, and say, that one without the other can only be a partial effect." And he does not hesitate to affirm that the strictest quarantine, enforced with all the power of a vigilant police, would at times be powerless without such a state of public health as the rigid enforcement of sanitary measures can alone secure. He goes further: "Sanitary measures first; quarantine next; and in time of disease, or when panic is taking hold of the minds of the people, both together."

In England, the General Board of Health, after a close investigation into all the facts within their reach, illustrating the system of quarantine, propose to discontinue entirely these sanative establishments, substituting for them a strict code of internal hygienic regulations; believing that quarantines afford no public security, having ever failed to prevent the introduction and spread of epidemic diseases.†

This Committee is unwilling to pledge itself to the extreme views embraced by this Commission, or, on the other hand, to agree in sentiment with those ultraists, who, from a different stand-point, are disposed to regard the quarantine system as the only safe means to be relied upon as a security from the invasion of pestilential and contagious diseases; nevertheless, it is fully impressed with the fact, that quarantines as they now exist, and in the manner in which they are now enforced,

* Remarks on the Efficiency of Quarantine, by W. T. Wragg, Charleston, 1854.

† Second Report of Quarantine. General Board of Health, London.

in this and in foreign countries, are not only inefficient and oppressive, but calculated to entail upon commerce and trade unnecessary interruptions and unreasonable embarrassments.

That in many instances they have failed to accomplish the laudable purpose for which they were originally instituted, history furnishes numerous melancholy examples. That the means adopted to dissipate the morbid agent conveyed by vessels, and to preserve their crews and passengers in a healthy state, have been the means of creating a foul atmosphere, and of nourishing and developing the very evil they were designed to prevent, is alike true. Nevertheless, throughout Europe and America their beneficial influence has been willingly acknowledged, and they have been adopted, in some form or other, as useful sanitary measures.

If, as Dr. Rush once proclaimed in his jeremiade against quarantine,* they did "originate in error," and if they "have been kept up by a supine and traditional faith in the opinions and conduct of our ancestors in medicine," it becomes our duty to investigate their claims, to expose the apparent inconsistencies existing in reference to them, and which trammel them in many of their leading features, and thus remove the rubbish of error by which they are surrounded; and if they have failed in numerous instances to arrest the progress and spread of epidemics, it must be conceded that they have at times aided in resisting the introduction of disease.

A judicious modification of the present unsound, ill-advised, and antiquated code of quarantine laws is therefore absolutely necessary.

The experience of your Committee in regard to the quarantine systems of this country, has long since convinced it of the propriety of such a modification, as shall place them upon an equality with the present improved state of the science of

* Rush's Works, vol. iv. p. 229.

hygiene. The requirements of the law are unnecessarily restrictive, burdensome, and embarrassing to commerce, and call loudly for reform. In order to accomplish this, an intimate and comprehensive acquaintance with the principles of separation and isolation, upon which all external sanitary regulations are constructed, is highly essential. Without this knowledge, the errors thrown around the entire machinery cannot be corrected. The details, and their practical application, involved in the proposed reform will be found under another head. It is enough here to submit for your consideration the importance of bringing up this interesting field of inquiry, to the present advanced state of the collateral sciences. In the department of hygiene, as it relates to an internal police, most valuable and extensive improvements have of late been suggested, and in many instances carried out. But without a corresponding advance in respect to the removal of the numerous evils connected with quarantines, as now administered, these reforms will not be available, to the same extent as they should be.

In this expression of opinion on the question of a reform in quarantine, the Committee is free to acknowledge, that while it desires a thorough change in the existing systems, it does not advocate an entire repeal of these laws. Its experience and observation lead to this conclusion, however it may differ from the results arrived at by the investigations and conclusions of enlightened commissions in Europe.

The suggestion for the entire abrogation of all quarantine restrictions upon commerce, at present so popular in England, is not new. Maclean and several of his countrymen made it long since. They first boldly asserted that quarantines "have no quality or qualities capable of counterbalancing in any degree the enormous mischiefs which they occasion to society." In the United States, fifty years ago, Rush, Caldwell, Potter, and other distinguished writers advanced similar views.

Dr. Rush says of quarantines: "They originated in error—millions of money have been wasted by them. Thousands of lives have been sacrificed by them."

Potter proclaimed to the world that they never arrested any disease except the Small Pox; and he insinuated that the United States should set the example of doing away with them entirely. He was so fully convinced that quarantines were useless appendages to health enactments, as to assert, that he "anticipated the era when our government would make it a national concern; when a consular convention, at least with the nations commercially connected with us, will put a period to a system which is a reflection upon our philosophical character."

Nor was this interesting, yet embarrassing question entirely lost sight of by our American statesmen. Mr. Jefferson, so long ago as 1804, while in the executive chair, in a communication to Congress on the state of the Union, protested against the prevalence of a code of laws to prevent the introduction of Yellow Fever.

Notwithstanding the weight of these authorities, the Committee is not prepared to ignore altogether the importance of restrictive measures—the enactment of a rational and judicious code of quarantine laws.

III. WHAT REFORMS ARE REQUIRED TO MAKE QUARANTINES MORE EFFICIENT AND LESS BURTHENSOME?

In the establishment of a quarantine, two objects are to be kept constantly in view, namely: 1st. That it shall be fully adequate to prevent the introduction of disease from without; and 2d. That it shall not interfere with the interests of commerce or the freedom of intercourse, any further than is absolutely necessary to insure its efficiency in the keeping out of disease.

It is universally conceded, that the only end for the attainment of which the establishment of a quarantine can be

justifiable, is the protection of the community from the production of disease in its midst, through the medium of infected vessels, cargoes, or crews, and that to this end all merely pecuniary interests, and even personal inconveniences, must be considered as secondary and subordinate.

There can be no hesitation in admitting that, with very judicious and well-administered preventive measures a large share of the benefit alluded to can be obtained ; at the same time it will scarcely be denied, that every system of quarantine which fails in the accomplishment of this, its only legitimate object, may probably be viewed as a grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea, that it is necessary as a prudent preventive measure. From an injudicious and imperfectly administered quarantine, few substantial advantages can result. It is too often but little more than an arbitrary curtailment of the freedom of intercourse and of trade.

*While therefore, we may be convinced of the propriety of the policy of adopting preventive measures, founded upon a correct appreciation of the mode in which vessels, arriving in a port, may become the means of inducing disease of a more or less malignant character, and which are at the same time administered and enforced with judgment as well as strictness, we must be prepared to denounce as worse than useless, every system of quarantine which, either from the incorrectness of the principles upon which it is founded, or from the careless and inefficient manner in which it is executed, is inadequate to guard the community against the introduction of disease from abroad.**

* The paragraphs in italics were substituted by the Convention for two in the original report, which were as follows :

Every system of quarantine which fails in the accomplishment of the only legitimate object of its institution, can be viewed in no other light than as a

To the question that has been submitted for investigation, it is somewhat difficult to furnish any categorical answer. By the terms of the question it would seem to be implied that there is now in operation a system of quarantine, so far correct in principles and practice, as to require only certain reforms in respect to some of its features, in order to render it sufficiently simple and efficient on the one hand, and on the other as little burdensome and restrictive as it is possible for quarantine regulations to be rendered. Now the Committee candidly confesses that it knows of no existing system of quarantine that can be esteemed correct in theory, or calculated to secure any beneficial result in practice.*

The most important, the loudest called-for improvement in respect to quarantine, is the inauguration, by every commercial nation, of a uniform system providing for the detention and strict examination, previously to its entering the harbor of a city, of every vessel which arrives, together with her crew, cargo, and passengers, with the view of detect-

grievous burden inflicted upon all who are subjected to its inconveniences and restrictions, under a false plea that it is necessary as a prudent preventive measure. From an inefficient or a badly and imperfectly administered quarantine no possible good can result. It is simply an arbitrary curtailment of the freedom of intercourse and of trade, without any equivalent good to justify its infliction.

While, however, the Committee would denounce as worse than useless, every system of quarantine which, either from the incorrectness of the principles upon which it is founded, or from the careless and inefficient manner in which it is carried into practice, is inadequate to guard the community against the introduction of disease from abroad, it is, nevertheless, fully convinced of the propriety and policy of a quarantine founded upon a correct appreciation of the mode in which vessels arriving in a port may become the means of introducing diseases of a more or less malignant character, and one which is, at the same time, administered and enforced with judgment as well as strictness.

* By reference to the debate it will be seen that objections were expressed to the language of this paragraph also, though no specific amendment to it was offered.

ing any causes which may exist on board, calculated to produce disease, whether it be the poisonous air contained in her hold, the accumulation of putrescent matters or of bilge water, fomites in the articles of her cargo, or in the clothing and other effects of her crew and passengers, or a contagion or infection emanating from the persons of the latter, and for the thorough ventilation and purification of the vessel and all on board of her. The treatment of each vessel and of her company, being based upon the facts ascertained in regard to her condition by the personal inquisition of proper officers, the port from whence she sailed or at which she had stopped or touched, the length of her voyage, the season of the year, and the condition in respect to health of the community among which her cargo, crew, and passengers are to be landed. The general outlines of such a system of quarantine, will be found most accurately sketched in the series of resolutions adopted at the first meeting of this Convention, held in the city of Philadelphia.

The Committee would remark, in this connection, that in order to the effectual carrying out of the scheme of quarantine to which it has reference, the officers to whom the examination of the vessels and their treatment are intrusted, should always be selected for their medical skill, their intimate acquaintance with the structure and internal arrangement of the various classes of ships, and at the same time for their shrewdness, devotedness, and integrity. It is important, also, that the decision of the officers in relation to the detention and mode of procedure, under the general provisions of the quarantine law, in reference to each vessel that arrives, should be absolute; or if an appeal is allowed, the authority to which the appeal is to be carried should be one that may be easily reached, having equal skill and experience, and the same opportunity for forming a correct judgment in the case, as those from whose decision the appeal is

taken, and that no unnecessary delay be allowed to take place between the appeal and its final adjudication. It must be evident, that if the decision of the quarantine officers is allowed to be under the control of an incompetent tribunal, or one liable to be influenced by popular prejudice, by the misrepresentation of interested parties, or by their own misconceptions or false conclusions, it may be reversed to the detriment of the health of an entire community; or, final action in reference to a vessel, cargo, and crew, detained by the quarantine officers, may be so long delayed, as to prove a serious loss to the owners, or to cause an increase of disease, or the engendering of more virulent morbid causes on board of her, all of which might have been certainly prevented by an earlier resort. in her case, to proper sanitary measures.

It is essential, also, that a gross abuse in relation to the treatment of such vessels, with their crews and passengers, as are detained under quarantine, should be remedied by strict legal provisions. That is, by the congregating of a large number of unclean and infected vessels, in situations where the neighboring shore is thickly studded with habitations, and at so short a distance inland as not to be beyond the reach of the foul emanations from the ships that are undergoing the process of ventilation and purification, whenever the wind blows from the latter towards the land. By thus bringing into close contact, in the situations referred to, a number of unclean and infected vessels, more especially when their crews, passengers, and cargoes are retained on board, and the weather is sultry and damp, it is scarcely possible to avoid the generation of a morbid atmosphere, by which disease, if it is not created, is kept up in and about the vessels, and which may be extended to those who dwell upon the neighboring shore, and who never have been in contact with either of the vessels under quarantine, or with any person or material from on board of them. In order, therefore, that the act

of quarantine itself shall not become a source of disease, it is an imperative duty on the part of those who are intrusted with the planning and execution of quarantine regulations, to provide for the separation of the vessels detained for examination, ventilation, or purification, from each other, and their removal at a sufficient distance from any thickly inhabited or much frequented locality; for the removal from on board of them of all passengers, and as many of the crew as can be spared without endangering the safety of the vessel, and with a due regard to her prompt and effectual purification—those removed from on board, being placed in such a situation on shore, as shall not endanger their health, or if already sick, that shall best secure their speedy recovery. If perfectly well, after their persons have been subjected to baths and ablutions, and their clothing has been thoroughly aired and washed, the best plan is to disperse them throughout the country, unless large, airy, dry, and well-located lodging apartments be provided for them, remote from the shipping at Quarantine, and the hospitals for the sick, and where they can be subjected to proper hygienic regulations. The sick must of course be received into well-constructed and properly-arranged and managed hospitals, with a due regard to effectual separation, and isolation of those laboring under contagious diseases. While no impediment should be placed to the entrance of those sick with Typhoid and Yellow Fever into such of the public hospitals as are willing to receive them, effectual measures should be insisted upon being adopted to prevent, as far as possible, poor, squalid immigrants, of improvident and uncleanly habits, whether sick or well, from crowding together in small, unwholesome dwellings, and in unhealthy, over-populated localities. From a neglect of this precaution, it is evident that the provisions of the best devised and most rigorously executed code of quarantine regulations, as a means of preventing the introduction of disease from without, will be effectually counteracted.

Another reform that is demanded, is to extend the system of quarantine throughout the entire year. A foul vessel may not, perhaps, be so liable to cause disease, when she arrives during the cooler seasons of the year, or after the setting in of frost, as she would had her arrival happened during the season of greatest heat; but a ship arriving with Small-pox, or Typhoid or Typhus Fever on board, even at mid-winter, is as legitimate a subject for quarantine as one with Yellow Fever on board, arriving in mid-summer, perhaps even more so—for the few cases of disease, comparatively speaking, to which the latter is liable to give rise, under ordinary circumstances, and the rarity with which that peculiar concurrence of circumstances supposed to be necessary for the extension of disease beyond the ship's company, or such as go on board of her, render the danger emanating from such a ship as nothing when compared with the amount of disease which under all circumstances may be caused by the former.

Perhaps, however, one of the most essential reforms, one far better adapted than almost any other measure that could be adopted to increase the efficiency, and at the same time to diminish the inconvenience and burdensomeness of quarantine, would be the adoption, by all commercial nations, of a sound and well-digested code of naval hygiene, and of the necessary measures for insuring its strict enforcement. This, under all circumstances, would not only confer an additional and very powerful security from disease on the crews of vessels and their passengers, but would diminish to a very great extent the danger of the introduction of disease by means of ships, or their companies or cargoes, recently arrived.

It is known that a vessel, coming from a port at which, at the period of her departure, there prevailed an epidemic, say of Yellow Fever or Cholera, of great malignancy, but which, it is almost universally believed, is not communicable directly from the sick to the well, will be liable to have the same dis-

ease break out during the voyage, among her crew and passengers, and upon her arrival in a perfectly healthy port, those who come on board her, or assist in unloading her cargo, or who dwell so near to the place where she is moored, and in such a direction as to receive the foul air from her hold, will be liable to an attack of the same disease as that affecting her own company; while, in certain cases of absolutely contagious affections, the infection will extend also to such as come in contact with her crew or passengers, or who handle their clothing, bedding, or other effects, even at a distance, and for some time after these persons and effects have been landed. Now it is not believed that all this may be prevented, nor that the necessity of proper precautionary measures, in respect to all vessels coming from unhealthy and infected ports, to prevent the introduction through them of disease, can be done away with, by any hygienic measures adopted previously to the sailing of such vessels, or during their voyage, but it is contended that the liability of disease occurring on board of them, and of its introduction by them at the port at which they arrive, may by such measures be greatly diminished.

But it is not always necessary that a vessel should sail from an infected locality, to have disease induced on board of her, or to cause her to bring to the place at which she arrives, a poison capable of engendering there the most fatal disease. A ship sailing from a perfectly healthy port, but overcrowded with a company composed chiefly of squalid, filthy, inadequately clothed and nourished, and perhaps intemperate individuals; unprovided with those things which are necessary for the maintenance of health in those on board, and, at the same time, leaky, damp, and badly ventilated, with a foul hold and perishable cargo, more especially if her voyage has been a protracted one, and the weather during it was wet and inclement, or intensely hot, will be as likely to have disease of a malignant type engendered among her crew and passengers and

to bring with her to the place at which she arrives, germs calculated to engender disease in all those with whom these unfortunately come in contact, as one sailing from the most unhealthy port known to commerce. Now, all this might be prevented by a judicious code of naval hygiene, acknowledged and rigidly enforced by all commercial nations. Were proper officers appointed at every port, with power to examine into the condition of all vessels sailing thence, in respect to construction, dryness, and ventilation; the health and number of the crew, the condition and accommodation of passengers, the sufficiency and quality of the food and water, and the general cleanliness of the vessel itself, and of the persons, clothing, and bedding of her entire company, and to allow no vessel to sail, that, in all these matters, falls below the proper hygienic standard; and were the officers of all vessels enjoined, under severe penalties, to see to their cleanliness, dryness, and ventilation during the entire voyage, as well as to the carrying into effect of those measures necessary to insure the health of of all on board, much would be done to prevent the occurrence of disease, before or after the arrival of a vessel, either among its own company, or, through it, among the people of the port at which its cargo, crew, and passengers are landed.

While this junction of a strictly executive system of naval hygiene, with a well-devised and prudently administered quarantine, must be considered as a provision from which there cannot fail, under all circumstances, to ensue results the most beneficial, it will become one of paramount importance, should a doctrine, which already ranks among its advocates a few of the most distinguished members of the medical profession, be confirmed by future more extended and accurate observation. Allusion is here made to the doctrine of the portation, from one place to another, of certain diseases which are neither contagious nor infectious in the strict medical sense of the latter term. In other words, the doctrine which supposes

that a zymotic principle may be carried, from a place at which some severe epidemic or endemic malady is prevailing, in the persons, clothing, and effects of those who have been subjected to the epidemic or endemic morbid influence, whatever this may be, or in the holds of vessels coming from such unhealthy localities; which zymotic principle is capable of producing, at the place at which these persons or vessels arrive, under certain favorable conditions, a morbid state of atmosphere more or less extended, which shall induce in those who are exposed to it, diseases similar in character and type, to those which prevailed at the place from which the supposed zymotic principle was imported. Your Committee is not called upon at this moment either to affirm or deny the truth of this doctrine. It nevertheless admits that it has the appearance of being sustained by a series of facts of a very plausible character, upon the strength of which, until at least the value and true bearing of these shall be determined, it would seem proper to insist upon the observance of judicious sanitary and quarantine regulations in respect to all vessels and persons, as well those departing from, as those arriving at, unhealthy ports; which regulations, as has been already remarked, must be beneficial in their results, even should the doctrine of the portation of disease be ultimately repudiated, and which are essential to the safety of every commercial city, should the doctrine be sustained by future observation.

In all the recent movements that have been made towards a reform of quarantine, vessels and persons arriving from foreign ports have, apparently, been viewed as its only proper objects. Now it must be evident that, in a country so vast as these United States, with so large and extended a commerce, both coastwise and through the medium of its large interior rivers and lakes, the possibility of disease being conveyed by means of this commerce from unhealthy to healthy localities, either by personal contagion or by infected ves-

sels and cargoes, is sufficient to demand the institution of suitable provisions to guard against it. The Committee is not prepared to say that it would be either proper or necessary, to subject our coasting and river trade to the same strict surveillance as is demanded in respect to our foreign commerce; nevertheless, the propriety and necessity of the establishment of sanitary and quarantine regulations, modified to meet the peculiar circumstances under which the former may become a medium for the introduction or propagation of disease, cannot for an instant be doubted.

One important measure at least is strongly demanded, and that is to prevent persons, merchandise, or effects, from being landed from on board of infected vessels, either for the purpose of escaping the quarantine regulations in reference to vessels from foreign ports, or permitted to evade the requirements of the latter, by reason of their insufficiency, or the lax manner in which they are administered. Small Pox has more than once been known to be thus introduced amid a community, and to produce a large amount of suffering and death. The proper remedy for this would be of course the establishment of proper quarantine regulations in respect to all vessels from abroad, the detention of infected persons arriving on board of them, and the purification of their clothing and effects, and such parts of the ship's cargo as may become fomites, for the transmission of a contagious or infectious principle, before they are allowed to be removed, all of which could readily be effected by the establishment of a general and judicious quarantine, and a uniformity of procedure, in carrying it into practice throughout the United States.

In respect to the extensive intercourse and trade constantly carried on between almost all the portions of this country, by means of our canals and railroads, there would seem to be but little necessity of quarantine regulations. Infected clothing, bedding, and merchandise may, it is true, be

thus occasionally transported, and become a medium for the propagation of disease. The proper remedy, however, is a strict enforcement of those quarantine regulations which relate to the disinfection of all merchandise and effects of a suspicious character arriving from abroad, and a proper sanitary system providing for a similar purification of every article capable of conveying disease, as fomites, in the places to which they are taken.

It is seldom that we need fear the conveyance, upon our railroads, of persons laboring under any contagious disease. This may, however, occasionally take place upon our canals. A few simple rules for the regulation of travel by canal will easily prevent this, and the proper enforcement of such rules, it does not appear to the committee can be attended with any very serious difficulty.

All of which is respectfully submitted.

WILSON JEWELL, *Chairman*.
JOHN M. MORIARTY,
WARNER CLEVELAND,
W. J. WRAGG,
R. LA ROCHE,
D. F. CONDIE,
WM. M. KEMP.

The undersigned, members of the Committee residing in Philadelphia, have occasion to regret that, owing to the lateness of the hour at which the answer of Dr. Wragg to the fourth question of the resolution reached them, there was not sufficient time allowed to print the same, and furnish proofs for the approval of the members of the Committee residing at a distance, before the meeting of the Convention.

They have deemed it advisable, therefore, not having the concurrence of the Committee, to submit the document to the Convention, as furnished by its author, over his own signature, and which will be found appended hereto.

They would state further, that the fifth question of the resolution was submitted for an answer to the member of the Committee from Brooklyn, whose communication will be in time for the meeting of the Convention.

WILSON JEWELL,
D. FRANCIS CONDIE,
R. LA ROCHE

PHILADELPHIA, April, 1859.

The fourth branch of the resolution referred to the Committee, is in the following words :

IV. IS A UNIFORM SYSTEM OF QUARANTINE LAWS FEASIBLE?
IF SO, TO PROPOSE A PLAN BY WHICH THE OBJECT
MAY BE ACCOMPLISHED.

Before attempting to answer the question contained in the first clause of the resolution, we must state how much we hope to effect by such laws, as well as the difficulties we may expect to meet with in our undertaking.

I. How much may we hope to effect by judiciously devised and faithfully executed quarantine laws ?

Under the supposition that such laws *may* be devised and executed, it behooves us to determine the circumstances in which they ought to be set in operation. This at once brings us to the all-important question, Which are the contagious diseases ? It is only in reference to these, that quarantine laws are useful.

Could we draw the distinction plainly between contagious and non-contagious diseases, our task would be an easy one. Unfortunately this point is full of obscurity.

With reference to some diseases, we know that they are eminently contagious, and will, by *immediate contact* with healthy subjects, reproduce themselves. But *only* by *immediate contact*. As instances, we may mention certain of the skin diseases, syphilis, &c.

To prevent the spread of these, it is only necessary to keep the sick from touching the well. Judicious quarantine laws, carefully and faithfully executed, can do this.

Another class of these diseases will reproduce themselves, by what is called *mediate contact*. The medium may be the air, when emanations from the bodies of the sick, having become diffused in the air, are applied to the bodies of the well through that means—or the clothes, bedding, &c., of the sick, may effect the contact. Quarantine, carefully devised and faithfully executed, may do much towards excluding this class of diseases.

But there is another form of disease, of which it is difficult to prove that its propagation depends either on *immediate* or *mediate contact*, between the well and the sick. There are those who believe that this class of diseases arises principally from local circumstances. These circumstances they trace rather to results of decomposition, than of secretion. The atmosphere is believed, by both sets of reasoners, to be the vehicle of the deleterious substance. But the difference of view entertained by them, consists in this, that the contagionists attribute the origin of the noxious matter to secretions formed in the bodies of the sick, and thrown off in such quantities as to impregnate the atmosphere sufficiently to enable it to act as a medium for applying, to the bodies of the well, enough of the secreted matter to generate in them the same disease; while the non-contagionists attribute it to the results of decomposition, by which the organic matters, both animal and vegetable, that are met with in certain situations, when acted on by the great promoters of decomposition, heat and moisture, become converted into poisonous gases, which mix with the air breathed by the resident population, and thus produce disease.

Among those who take this latter view of the subject, there are some who believe (in addition to the source of atmo-

spheric deterioration mentioned) in an unknown, and not to be detected agent of disease in the atmosphere, which, for want of a better designation, they call its *epidemic condition*. This agent or condition, though it cannot be detected by our present means of investigation into the state or constitution of the air, is plainly traceable in its effects on the populations which live in, and breathe the atmosphere thus constituted, and furnishes a sufficient solution to many of the differences we observe in the healthfulness of the same localities at different times. In accounts for the progress of certain migratory diseases over large areas of country—over spaces of such great extent, that every variety of climate, soil, and season, are often included in their visitations—so that their courses can only be explained on the supposition that there is an element in the air that acts, irrespective of every other circumstance, in communicating the disease to the different communities.

It is the difference of opinion entertained on this point, by the contagionists and non-contagionists, *i. e.*, in reference to the manner in which these diseases propagate themselves, that causes all the discussion between the quarantinists and the non-quarantinists. Both parties believe that the atmosphere is the vehicle; but they differ as to the nature and origin of the poison which the atmosphere conveys. Hence they also differ as to the measures best calculated for excluding the diseases in question, from communities.

The diseases which, by their fatal effects on communities, it is most particularly desirable that we should succeed in controlling, are the very ones in reference to which most uncertainty of opinion exists. Yellow fever and cholera are our most fearful enemies in populous communities, and these diseases are differently classed by the advocates of the different views sketched out above.

But if this were all, it might be easy, by a compromise,

to get over all difficulty. It would only be necessary to know that the disease entered by one of two doors, in order to be able to exclude it by closing *them both*, if we could do so. But, unfortunately, this is a difficulty, even more serious and harder to overcome, than the first. Great and important as the objects to be attained are, the difficulties in the way of strict enforcement of quarantine laws, and also of hygienic measures, render it almost impossible for us to elaborate, and set in operation, such a system, in reference to each of them, as will be efficient for the attainment of the object in view. The interruption to the pursuit of private enterprises; for the attainment of wealth, which all such laws occasion, sets large numbers of the community in arms against their execution, and where the cry of the public does not suffice to deter the authorities from planning and putting them in execution, the cunning of the interested parties is exercised to elude them. This is so fertile in invention, and bold and skillful in execution, that it has been found, by experience, to be more than the power and resources of the most despotic governments can effect. The triple cordons sanitaires of European nations, hedged around, and guarded by all the prestige of the bayonet and the gens d'armes, have miserably failed to check the progress of men and merchandise in the circles of commerce; and that through the simple action of a judiciously administered douceur. Ten thousand times more signal must be the failure of all such devices, in our country, through the still more potent influence of an innate feeling of individual liberty of action, unless we can strike out some new way of effecting our object.

And while this is all true in reference to the contagious principle, the other element of disease in the atmosphere, viz., the epidemic constitution, cannot be directly controlled by any human power, and can only be partially modified, in an indirect way, by so improving the local condition of the air, as

to render the constitutions of those breathing it, insusceptible to disease.

It would be easy to show, from an analysis of the quarantine laws of the different States in our Union, how many difficulties, in the way of their efficiency, are inherent in the laws themselves, and additional to those, just alluded to, as belonging to the general view of the subject. Such an undertaking, however, would lead us into great length and tediousness, and would not suggest any useful hints for extricating us from our difficulties. We may, nevertheless, as an example, allude to one or two provisions in the quarantine of Charleston, South Carolina, which will illustrate what we say. This law was drawn up with as much care, perhaps, as any similar law in this country. It was the work of one who was most conscientiously convinced of the sufficiency of a good quarantine law to effect the desired object. It was produced, and set in operation, at a time when the minds of the community were prepared, by repeated returns of the devastating pestilence into the city, to try any plan, that offered a chance of success, for excluding it. And, in order that there might be no mistake in reference to the applicability of the law to all places from which yellow fever might come, the sweeping clause, we are about to refer to, was introduced.

In the 3d art. of the 1st sec., we read: "All vessels, direct or indirect, from any place in the West Indies, or from any place in America, in the ordinary passage from which they pass south of Georgia, known to be liable to the prevalence of yellow, malignant, or other pestilential or infectious fever, or at which said fever existed at the time of departure, or which shall have arrived at any such place and proceeded from thence to Charleston, or on board of which, during the voyage, any case of such fever shall have occurred, arriving between the 31st day of May and the 1st day of October, shall remain at quarantine for at least thirty days after their

arrival, and at least twenty days after their cargo shall have been discharged, and shall perform such further quarantine as the port physician shall prescribe."

Here it will be seen that no discrimination is made between ports in which yellow fever *does* exist, and those in which it *does not*. "All vessels, direct or indirect, from any place in the West Indies, or from any place in America, in the ordinary passage from which they pass south of Georgia, known to be liable," &c.; "or which shall have arrived at any such place and proceeded from thence to Charleston," &c.

The yellow fever may be raging at Havana and not at Matanzas or Baracoa; it may prevail throughout the ports of Cuba, but in none of those of the Bahama group; it may exist at New Orleans, but not at Mobile; the ports of Texas may be scourged, while those of Florida are healthy, yet no discrimination can be made by the health officer. All must be subjected to the same rigid quarantine—"at least thirty days after their arrival, and at least twenty days after their cargoes shall have been discharged."

In all this there is no discretion allowed the port physician, or even the mayor of the city, or the governor of the State. This rigidity in the law was expressly intended to stand between the authorities and the parties interested in the vessels. It was intended that the law should say all, and leave nothing for the authorities to say, so that the urgency of private interests might not press so powerfully on the officers, as to swerve them from their duties. This, in theory, seems to be the true ground for the framers of the law to take. Yet the working of it, in practice, is far different from what the theory contemplates. The very absence of discretion, in the authorities, proved a greater difficulty than any abuse of this discretion could have been. Thus a vessel arriving from a port "in the ordinary passage from which she passed south of Georgia," and having a clean bill of health, the port from

which she sailed being at the time perfectly well known to be free of yellow fever, so notoriously so that all concerned in the enforcement of the law are compelled to acknowledge it, is, nevertheless, brought to for thirty days, in the midst of a fleet of infected vessels, and soon becomes, under the operation of the law, what she was not before, viz., a diseased ship. A sailor on board takes fever, from the vicinity of infected vessels, and then the only discretion allowed the Port Physician is brought into action, and the thirty days is indefinitely prolonged. For it is added, she "shall perform such further quarantine as the Port Physician shall prescribe."

Again: a vessel sails from a distant port, say Rio Janeiro, which may be healthy at the time. She has a voyage of sixty days, without sickness on board, yet on reaching Charleston, she must perform the thirty days' quarantine, and if, from any cause, she be prevented from discharging the cargo till the thirty days are out, twenty days more, making fifty, which added to the sixty of the voyage, make one hundred and ten from the port before she is adjudged free from infection. Another vessel sails from Havana, where the Fever is raging at the time. She reaches Charleston in three days, and performs the thirty days' quarantine, taking care to lighter out her cargo within the first ten days. She is, therefore, exonerated from restraint at the end of thirty-three days. So that the vessel from the healthy port is not more safe (under the operation of this theory) at the end of one hundred and ten days, than the one from the infected port is at the end of thirty-three days.

So much for the working of that feature of the law, which looks to the relief of the acting authorities, from the influences which private interests are known to set in motion, for the purpose of biasing them in the discharge of their duties.

The 4th art. aims at providing for all the cases not covered by art. 3d, by giving to the Port Physician the very discre-

tion which was so scrupulously withheld from him by the latter art. It says: "Art. 4th. All vessels embraced in the foregoing clause, arriving during the months of April and October; all vessels from a foreign port, on board of which, during the voyage, or while at the port of departure, any person shall have been sick; and all vessels from any place (including islands) in Asia, Africa, or the Mediterranean, arriving between the 1st day of April and the 1st day of November, shall be subject to such quarantine, and other rules and regulations, as the Port Physician shall prescribe."

Thus for seven months out of the year the Port Physician is empowered, by this article, to stop vessels from all ports if there has been sickness on board, either on the voyage or while at the port of departure, even though months may have elapsed since the case occurred, and subject them to such quarantine and other rules and regulations as he may prescribe.

In the 10th art. of the 3d sec., it is made "the duty of the Mayor and Port Physician diligently to inquire into and seek out such places, ports, or cities, where there shall be reason to believe a pestilential or infectious fever actually existed, and to declare such place, port, or city, to be infected within the meaning of this ordinance," &c.

With such a carefully combined system of discretion granted to the officers on the one hand, and withheld from them on the other, it would seem that the law had done about all that it could effect, for the purpose of designating the ports which should be declared infected; and yet in truth, the greatest of all the difficulties is still left untouched. The Mayor and Port Physician may "diligently inquire into and seek out" infected places. But how are they to come at the information? Not from the captain of the vessel, for he will scarcely betray his valuable secret. Not from newspaper paragraphs, for they are not very reliable. Not from the merchants and

correspondents engaged in business operations with the places in question, for they would hardly have self-sacrificing magnanimity enough to throw their speculations away for the objects of, at best, a fancied good. The means of getting this important preliminary information is not yet suggested. We hope to do so before we finish. But we must first view the present system of quarantine laws under other aspects, not less important to an estimate of their value.

We will not push the analysis of these laws any further. We may say, however, before leaving this part of the subject, that our forbearance is voluntary. The material is at hand, but time and space are wanting.

Let us pass on now to consider some of the difficulties in the way of enforcing these laws as they now ex-

One of the first that suggests itself, is referable to the separate and independent State sovereignties. Neighboring cities in different States, prompted by the stimulus of rivalry, cannot withstand the temptation held out to them to undermine the commerce of each other, by acts which result directly in the destruction of all quarantine restrictions. The laws of one State not being of force in another, enables one party to undo all the other hopes to obtain from its quarantine acts. As soon as one city sets in operation a stringent law, by the action of which the trade of infected or suspected ports is hampered, its neighbor has only to follow an opposite policy, and the result is a gain corresponding in amount to the loss sustained by the first. This at once renders it difficult for the authorities of any city to face the opposition raised by interested parties, who not only see their gains cut off, but have the mortification of knowing that they all go into the coffers of their less scrupulous neighbors; while the commercial prosperity and importance of the respective cities is materially altered.

But this is not all. The means of intercourse by steam

renders even distant places, to all intents and purposes, contiguous. The passengers who are excluded from landing in any port, till the requisitions of a rigid quarantine shall have been complied with, will not debar themselves from the privileges of freely traveling about from place to place; nor will they submit to the nuisance of a tedious detention. They will very quietly evade the law by shipping for the place that dispenses with restrictions, and then, by land routes or coast-wise, enter, bag and baggage, into the other, thus rendering the law of no avail as a sanitary measure, while it damages the prosperity and wealth of the port in which it is enforced to a degree which we need not now stop to calculate.

The extent to which this difficulty goes in the way of any efficiency in the quarantine system, as at present employed, does not confine itself to neighboring cities. The quarantinists now say, that the length of time necessary for purifying an infected vessel or cargo is not known. It is certain, however, they say, that at least thirty days are requisite to ascertain whether that vessel is, in fact, healthy or infected. If she has been proved infected, sixty, ninety, or even more days are insufficient to get the pestilence out of her. Now this period is long enough for a voyage to California. And when we reflect that quarantined vessels may, at their discretion, hoist their sails at any time and be off, provided they go seaward, we will see how easy it is for the pestilence to go from place to place, in any one of any number of ways.

But let us confine our investigations to a more limited range, and see how the quarantine laws can be made available for the protection of the city that has placed itself under their influence. The great desideratum, of course, is to prevent intercourse between the ships, their cargoes, and their people, and the land. So far as the ship is concerned, this is not difficult. She is brought to, by the pilot, at the appointed place, and there she must remain till released, or till she weighs anchor

and returns seaward. But the matter begins to be complicated when the disposal of the cargo is in question. Shall it remain on board, and either perish by natural decay, thus entailing an entire loss upon the owners, at the same time that it adds an indefinite amount to the filth and unwholesomeness of the ship, or, by losing the time and opportunity of the market, equally injure the interests of the merchant? Or shall it be removed to such place as may be indicated by the law, there to undergo delays and purifications sufficient to render it safe? If the law admits the latter alternative, it must make such provision for carrying out its requirements, as shall not only guard the community against danger, but preserve the property itself from destruction. Unless this latter provision exists, it is to be assumed that losses from exposure of goods, &c., without adequate protection, must be made good to the parties. In other words, proper warehouses, &c., must be provided. For this purpose an abundant outlay of money is necessary, or else substitutes for such specially constructed buildings must be found; which cannot usually be done, since the ample accommodation required is not to be obtained in remote parts of cities.

But, suppose this difficulty overcome, how is the disembarkation to be effected, and the goods transferred? The plan relied upon is the use of lighters. Now if Yellow Fever is the subtly contagious disease it is claimed to be by quarantinists, what, let us ask, is gained by exchanging the direct intercourse of the vessel discharging her own cargo for that of the lighter? The one places its goods upon the other, and thus they go to the warehouse. The goods are the same, they have come out of the same hold, and go into the same warehouse. They are as much infected after they leave the lighter, as they were before they went into it, or at least, as they would be if they got into the warehouse by one handling. And the number of persons brought into contact with them is so much greater, that the chances of contamination are just

so much increased, as the number of employees are more numerous. Nothing, therefore, in point of safety from disease, seems to be gained by this intervention. But from it arises an abuse which entails upon commerce charges and expenses too grievous to be borne

We take from the *New York Journal of Commerce* the following example, said not to be the worst instance that could be cited :

OF OFFICE QUARANTINE STORAGE, 109 Wall st., August 25th, 1858.	
Mr. L. H. M., to Union Lighter Co.,	Dr.
To storage on 308 bales of cotton, @ 2s. per bale,.....	\$77 00
To labor on do. @ 2s. per bale in boat,.....	77 00
To lighterage from vessel on do.. @ 3s. per bale,.....	115 50
	<hr/>
	\$269 50

"The cotton on which this expense has been incurred was taken from the vessel and conveyed to a barge, where it now remains. The present charges amount to \$269.50, nearly one dollar per bale, and if the barge is not allowed to come up to the city, of which there is still some doubt, there will be another bill of 31 cents per bale. The total freight on the above, from Charleston to this port, was 25 cents per bale, while the intermediate expenses between arrival and the date, when the owner obtains possession, are four times that amount."

From the *New York Commercial Advertiser* we take the following statement, signed by twenty-two ship captains, whose vessels were undergoing the exactions complained of :

" *To the Editors of the Commercial Advertiser* : For the benefit of the owners of Eastern vessels, we think it proper to state a few of the exactions practised upon them at the Quarantine at this port. And here we would say that none of us would object to a most rigid quarantine, in all cases where necessary, especially if it was properly conducted, but to the miserable farce practised here we do object.

"Vessels are detained a long time at Quarantine upon the

most trifling pretexts, their cargoes discharged there at a very heavy and unnecessary expense, not to preserve the health of New York, but for the benefit of whom it may concern, while the crew and passengers, with little or no delay, are allowed to come up to the city.

"We will state a few of the exactions imposed on vessels, and will commence with the Health Officer, who boards the vessel upon her arrival. His fee is \$6 $\frac{5}{100}$. He is followed by the Port Warden, whose fee is \$5 for looking at the hatches. This must be done before the fumigator can be supposed to expose a handful of chloride of lime in the cabin and fore-castle, for which his fee is \$6. After which the stevedore (one of whom monopolizes this business) presents his bill for discharging cargo (for signature), before he commences his work—and he will not commence until his bill is signed as correct; he charges 44 cents per hhd. for discharging sugar, and for other articles in proportion; the charge for this work in New York is but 12 cents per hhd.; if we refuse the stevedore's services, and prefer discharging with our crews, we can wait for lighters until the parties in power think proper to send them, the detention probably amounting to more than the exaction of the stevedores. We are charged 8 cents per hhd. cooorage for each hhd. on board, even if not a hhd. should require coooring.

"After a cargo is discharged, we are again charged \$6 for the farce of exposing a handful of chloride of lime in the hold. After which, whether we have any dunnage on board or not, it is supposed to be burned, for which we are charged \$6. Many vessels, after having obtained permits from the Health Officer to discharge, have been detained from one to two weeks waiting for the stevedore (who monopolizes this business) to discharge them.

"We understand there are now so many vessels detained at the upper Quarantine, it is the intention, hereafter, to de-

tain vessels at the lower ground, in which case they will be in a very exposed situation, and the expense will be much increased.

"The above exactions, and many others, too numerous to mention, absorb all the vessel's earnings, and, if persisted in, ought to be sufficient cause to prevent sending vessels to this port during the summer months." (Signed by twenty-two ship captains.)

The editor of the *Commercial Advertiser*, in introducing the statement given above, says: "Stevedores engaged in discharging vessels that come into port without sickness, continue to be taken down with fever. This shows that the poison is packed away with the cargo, and is liable to make its appearance whenever the goods are stirred about."

So much for the difficulties inherent in the lighterage system. Is the safety of the inhabitants of the quarantining city advanced by this operation, supposing that all its difficulties can be overcome?

To answer this most important question we must follow the cargo a few steps further, and see what becomes of it. It is placed in stores which, we may admit, for argument, are isolated from all contact with other places; though, in point of fact, this can only be accomplished at those quarantine stations where warehouses are constructed of adequate dimensions, and upon a proper plan. Now, as there are few or none such, it might be claimed that the isolation of lightered cargoes is a myth. But we will admit that they are isolated. How are they purged of their infectious poison? By fumigations and cleansing? There are no means known to science adequate to the accomplishment of the disinfecting process, by either of these ways or by both. By airing? It is simply impossible to do this effectually with a heavy amount of goods; and, if attempted, would result in the illness of all unacclimated laborers engaged in the work, and these sick

men would cause the very mischief their operations were intended to prevent. Can the poison be got rid of by the detention of the cargoes in store? The quarantinists tell us there is no known term of life or duration for the contagious germ. Therefore, to attempt to get rid of it by simple delay, would fail as miserably as by the other ways. In short, the cargo is just as dangerous after its lighterage as it was before; so that, when it is released from the Quarantine and circulated in the community, it goes there as full of risk as it was before the expensive and vexatious process was performed.

We may add a word here in reference to the feeling of resistance, engendered against the quarantine laws, in those who live near the station. This resistance we have lately seen carried to the utmost extreme, and a precedent set on the subject which yet threatens further and still more extreme consequences.

But let us leave the cargo, and look for a moment at the crews and passengers, as well as all the other persons concerned about ships, and see if quarantine laws promise much towards keeping them in such a state of isolation as may prevent the introduction of pestilence through them.

The pilot who boards the vessel has his home in the city, and he leaves the vessel to return thither as soon as his duties are accomplished. No means of purification are resorted to, and, if they were, we may say of them that they would be of small avail, for it was remarked above that science has, as yet, devised no disinfectants worthy to be called so. The pilot is therefore an unsafe man, and arrests the law of safety at the first step.

Next comes the Health Officer. His history and movements are about the same.

Then the consignees and ship-masters, who, on various pretexts, get access to and from the vessels and the shore.

Then the crew, with their tricks to get ashore, and

traders and others to get on board: the traffic in illicit articles carried on by unlawful means; the stevedores and their men; the crews of the lighters; all of these have their residences in the city or along shore, and carry in their clothes any infection that exists in the vessel; and when they are taken sick it is at their own homes, and they thus do the very mischief that the whole of this elaborate machinery was devised to prevent.

But the most refractory of all the personnel of the shipping are the passengers. How are they to be restrained? We might simply refer to the habits of personal liberty so dear to the people of our country; to their instinctive and innate loathing of all bodily restraint; to their characteristic impatience of delay, in order to show how difficult it is to carry out quarantine laws in reference to them.

But there are difficulties beyond these—difficulties far more insurmountable. They are those presented by the facilities of travel, afforded by railroads and steam-ships co-operating with the unsettled policy of the different States and cities in regard to quarantine laws. Thus New Orleans relaxes her restrictions, while Charleston binds hers closer. Passengers have only to enter the one port and take an inland route for the other, and they arrive there in spite of the law, in time to do all the mischief that is dreaded. So of Savannah and Charleston, soon to be united by a railroad which will put passengers from one city to the other in three and a half hours—quicker by far than they could travel by sea.

It is useless to pursue this subject. Enough has been said to show that no restrictive laws upon vessels, cargoes, crews, or passengers, can be so framed as to control any one of these after once they are in port. Much may be done to render commerce a burdensome and a losing business to all concerned in it; much may be done to stir up communities to discontent and rebellion; but absolutely nothing to keep

disease at bay, if it is allowed to come to the doors of our cities.

If there is any thing hopeful or promising in a system of quarantine laws, they must include two indispensable requisites: first, they must effect an absolute exclusion of all infected articles, whether they be animate or inanimate; second, they must be in force equally and uniformly throughout the United States.

First: they must effect an absolute exclusion.

This we have shown cannot be done by any restrictive measures which are to operate at this end of the line—cannot be effected by any laws contemplating the regulation of the vessels, cargoes, crews, and passengers, in *our* ports. It can only be done by such laws and regulations as shall act upon these objects in *the infected ports*.

With this in view, we offer the following suggestions as a nucleus for the beginning of something better than we have yet had; or, at least, more uniform.

Let orders be issued from the proper source to the United States consuls, in all foreign ports, to send on to Washington the earliest information of the existence of any one of the diseases named upon a list to be furnished him, with such particulars as may be important towards determining whether it is of a sporadic or epidemic character. That this duty may be absolutely obligatory, it would probably be best to procure the passage of a law by Congress on the subject. This information might be sent to the Secretary for the Home department, or to the Smithsonian Institute, from whence it could be disseminated to all the sea-ports of the country for the information of the local authorities. At the same time that the consul transmits this information to Washington, he should be required to notify the authorities of the port in which he is acting, and to give such publicity to the fact as shall bring it fully to the knowledge of all interested parties there.

The manner of disseminating the information when received at the department, or at the Smithsonian Institute, should be, at first by a dispatch (sent by telegraph whenever practicable), and then, by the earliest mail opportunity, by a written communication, properly signed and sealed, directed to the Governor of each State, who shall transmit it to the Mayor of each city which is a port of entry, or the local authorities of any place admitting of foreign intercourse by sea.

Upon the reception of this news, it should be the duty of the acting authority of each place (made so by law) to announce by proclamation, that quarantine is in force, in reference to that foreign port, so to continue till notice from the consul, communicated in the same way, shall apprise the local authorities of the disappearance of the disease at his port, when the law shall at once be suspended, by proclamation as before.

The requirements of the law to be enforced under this system, may in a general way, be stated to be, that intercourse between the infected port and all ports of the United States is interdicted, during the prevalence of disease there. Hence orders must be issued to the pilots at each port, in accordance therewith, so that if any vessels, having left the infected port, either directly or indirectly, should arrive at the bar, they should at once notify the captains of the proclamation, exhibit a copy of the newspaper, or other publication, through which it is promulgated, and refuse to conduct them into port. This duty must be exacted of the pilots, by a clause of the quarantine law, under suitable penalties for neglect or violation.

Should any captain of a vessel, so arriving, refuse to act upon the information thus given by the pilot, and enter the port, by bringing his vessel in himself, it should be made the duty of the acting authorities to seize upon such vessel, and having caused her to be immediately conducted out of the

port, and the captain to give bonds in heavy penalties, with personal security, not to violate the law again, allow him to depart without further molestation. But for a second offense the penalties should be made to fall heavily, both on the captain and owners.

In order that the pilots may be prepared to obtain such information as they require, for the purpose of carrying out the objects of the law, they should be provided by the authorities with a set of questions (drawn up and arranged as a part of the quarantine law and enacted along with it), to be propounded to the captains of all vessels arriving at the bar. And the law should make proper provision for compelling captains to give the information demanded.

So far the provisions of the law have reference to the intercourse of the United States with foreign ports. It will be necessary to apply them to the coastwise intercourse, or that between the different ports of this country. In this respect the provisions may be much modified. Upon the principles laid down by the importationists, a very considerable relaxation in the stringency of the law may be allowed.

It is alleged, by them, that the quality of contagion, infection, or transmissibility, is only to be predicated of that form of Yellow Fever which is peculiar to intertropical regions. They admit that a combination of local causes will give origin to a form of disease, in every particular resembling genuine Yellow Fever of the tropics, except in that of its transmissibility. This locally generated fever will assume every characteristic of the infectious form, except that it will be unable to reproduce itself. Depending for its existence on causes circumscribed in extent and incapable of transference to any other place, its victims cannot carry with them, in their migrations, the elements of its reproduction. It is, in this form, essentially an endemic disease; as much so as remittent and intermittent fever. To suffer its attacks the patients

must come to the disease ; the disease cannot be carried to the patients. While, on the other hand, the intertropical form is essentially contagious, infectious, or transmissible. Vessels, goods, or persons, coming from the places in which it exists, are capable of originating it in communities which were absolutely healthy before. And persons sick of it can communicate it to others. It can be transferred from place to place by the appliances of commerce, and when introduced it can take root and send off shoots into other places.

This distinction is absolutely necessary to the advocates of the importation doctrine. Without it they cannot account for the numerous and well-authenticated instances where the disease, after introduction into communities, has failed to spread. In all these instances, according to them, it has been the spurious and not the genuine disease.

It is only by a process of reasoning, based on this view, that the contagionists can sustain themselves against the facts and arguments of their opponents. It is only in this view of the subject that their support of the affirmative side of the quarantine question has any significance.

It will be proper, then, while giving all the stringency to quarantine laws, having reference to the intertropical disease, which it demands, to allow such relaxation, in reference to the domestic disease, as may be useful to commerce, while it is not detrimental to health.

If by the means we have indicated rather than elaborated, "an absolute exclusion of all infected articles both animate and inanimate," can be effected, it only remains for us to suggest some plan by which the law may be made of force equally and uniformly throughout the United States.

Secondly. With this view the first idea that suggests itself is, that it should be passed by Congress. No less expansive an authority should be invoked, if this can be made available. A law intended to act with equal and uniform power in every

State and city in the Union, requiring for its enforcement a large display of means and appliances, which will be more effective in each part in proportion as it acts uniformly in all, should, doubtless, emanate from the common source of authority. By no plan can the difficulties, in the way of getting a law of this kind adopted, be so readily overcome as by availing of the compromising spirit in which those who are in the habit of legislating for the good of the whole, rather than for the interests of the separate parts, do work of this kind. A law intended to operate equally throughout the Union could emanate from no source so properly as from the only body in which representatives from all the States are assembled.

But it does not appear that Congress has the power to pass such laws.

We find in *Brightly's Digest*, p. 810, under the head of Quarantine and Health Laws, an act of Congress passed Feb. 25, 1779. By the third section of this act it is provided, that "there shall be purchased or erected, under the orders of the President of the United States, suitable warehouses, with wharves and inclosures, where goods and merchandise may be unladen and deposited from any vessel which shall be subject to a quarantial, or other restraint, pursuant to the health laws of any State as aforesaid, at such convenient place or places therein, as the safety of the public revenue and the observance of such health laws may require."

But it is evident that this provision has reference to the safety of the revenue, and not to the enforcement of a quarantine law. That the subject of quarantine is held to be a State and not a United States matter, will appear evident from the whole tenor of this law. Thus the 1st section provides that the quarantine laws of the States shall be observed by the Federal officers; that these officers shall aid in their execution; and that the Secretary of the Treasury is authorized to extend the time for making entries, &c., when

a conformity to such health laws shall require it. Section 2d, provides that vessels prohibited by the health laws of any State from coming to at ports of delivery, may unload elsewhere; the cargo to be warehoused; and special permits granted, &c. Sections 4th, 5th, 6th, and 7th, provide for the removal of custom-house officers, prisoners, public officers, and the Supreme Court, from unhealthy to healthy places, and section 8th provides that the cost of such removal shall be reported to Congress.

Throughout the whole of this law, it is evident that the authority of the States to enact quarantine laws is fully recognized. The injunction it contains upon Federal officers to aid in the execution of such laws, confirms and strengthens this view.

In the case of *Gibbons v. Ogden* (*Wheaton's Reports*, vol. 9), the opinions of the eminent lawyers engaged in that important case are incidentally given on this point. Mr. Webster, for the appellant, in his opening argument, says (at p. 18): "When, until now, have they" (the States) "interfered with the navigation of the country? The pilot laws, the health laws, or quarantine laws, and various regulations of that class, which have been recognized by Congress, are no arguments to prove, even if they are to be called commercial regulations (which they are not), that other regulations, more directly and strictly commercial, are not solely within the power of Congress." "The truth was, he thought, that these things were, in their general character, rather regulations of police than of commerce, in the constitutional understanding of that term." "Quarantine laws, for example, may be considered as affecting commerce, yet they are, in their nature, health laws. In England we speak of the power of regulating commerce, as in Parliament, or the King, as arbiter of commerce, yet the city of London enacts health laws. Would any one infer, from that circumstance, that the city of London had

concurrent power with Parliament or the Crown, to regulate commerce? Or that it might grant a monopoly to navigate the Thames? While a health law is reasonable, it is a health law; but, if, under color of it, enactments should be made for other purposes, such enactments might be void."

Mr. Emmett, for the respondent, although taking a different view of the character of the quarantine laws, yet agrees with Mr. Webster that they are not within the competency of Congress. He says (*idem*, p. 112): "The quarantine laws further illustrate our position. The appellant's counsel says, these are to be considered merely as laws of police; they are laws of police, but they are also laws of commerce; for such is the nature of that commerce, which we are told must be regulated exclusively by Congress, that it enters into and mixes itself with almost all the concerns of life. But surely that furnishes an argument showing the necessity that the States should have *concurrent* power over it. Judge Tucker considers them as laws of commerce when he says: 'Another consequence of the right of regulating foreign commerce, seems to be the power of compelling vessels infected with any contagious disease, or arriving from places usually infected with them, to perform their quarantine. The laws of the respective States upon this subject were, by some persons, supposed to have been virtually repealed by the Constitution of the United States; but Congress have manifested a different interpretation of that instrument, and have passed several acts for giving aid and effect to the execution of the laws of the several States respecting quarantine.' It will be recollected that the first recognition by Congress of the quarantine laws, was in 1796; and that only directs the *officers of the Government* to obey them, but does not pretend or attempt to legalize them. And, indeed, it could not do so, if the States had no concurrent power, and the regulation of commerce was *exclusively* delegated to Congress; for the

power which is *exclusively* delegated to Congress, can only be exercised by Congress itself, and cannot be subdelegated by it. It is, therefore, no reply to the force of the argument to say that they have been ratified by Congress.

“ Another answer to that observation is, that the supposed ratification by Congress did not take place until 1796; and that many of these laws were in active operation several years before. For instance, as a few out of many: *New Hampshire* passed her quarantine laws first, February 3d, 1786,* and again on the 25th of September, 1792.† *Connecticut* passed hers in May, 1795.‡ The laws of *Maryland* § show the temporary continuation of those laws in that State from 1784 to 1785, from 1785 to 1792, from 1792 to 1799, and so down to 1810; and the second volume ¶ contains a law passed November, 1793, giving to the Governor the strongest powers on the subject. The State of *Virginia* passed, 26th of December, 1792, ¶ ‘ An act for reducing into one the several acts to oblige vessels coming from foreign ports, to perform quarantine;’ which act was amended on the 5th of December, 1793,** and further amended on the 19th of December, 1795.†† *Georgia* passed her quarantine laws December 17th, 1793.‡‡ Undoubtedly these laws derive their efficacy from the sovereign authority of the States; and they expressly restrain, and, indeed, prohibit, the entry of vessels into part of the waters and ports of the States. They are all so similar that one or two may suffice as examples. The quarantine laws of *Georgia*, §. 1, prohibits the landing of persons or goods coming in any

* Melcher's ed., p. 302.

† Ibid. p. 304.

‡ Ibid. p. 611.

§ Ibid. vol. i. p. 270.

¶ Ibid. p. 200.

¶ Ibid. vol. i. p. 244.

** Ibid. p. 312.

†† Ibid. p. 349.

‡‡ Marbury and Crawford's Dig. p. 393.

vessel from an infected place, without permission from the proper authorities, and enacts that the said vessels or boats, and the persons and goods coming and imported in, or going on board, during the time of quarantine, and all ships, vessels, boats, and persons receiving any person or goods under quarantine, shall be subject to such orders, rules, and directions, touching quarantine, as shall be made by the authority directing the same. The law of *Delaware*, passed on the 24th January, 1797,* S. 1, provides that 'no master of a ship bound to any port of that State, having on board any greater number of passengers than forty, or any person with an infectious disease, or coming from a sickly port, shall bring his ship, or suffer it to be brought, nearer than one mile to any port or place of landing, nor land such persons, or their goods, till he shall have obtained a permit.' The law of *Massachusetts*, passed June 22d, 1797, S. 6,† enacts that 'vessels passing the Castle, in Boston harbor, may be questioned and detained; S. 12, that vessels at any other port than Boston, may be prevented from coming up, and brought to anchor where the select-men shall direct; S. 4 empowers the select-men of any town bordering on either of the neighboring States, to appoint persons to attend the ferries and other proper places, by or over which passengers may pass from such infected places, which persons have power to examine, stop, and restrain such passengers from traveling, until licensed by a justice of the peace or the select-men; and a fine of 100 pounds is enacted on the passenger presuming to travel onwards; S. 5 gives power to seize and detain suspected goods coming from any other State,' &c. By an act of June 20th, 1799, S. 10,‡ 'Any master, &c., who shall enter the harbor of Boston after notice of a quarantine, for all vessels coming

* Del. Laws, p. 788.

† 2 Mass. Laws, p. 788.

‡ Ibid. p. 872.

from the same place, &c., or who shall land, or suffer to be landed, any passenger or goods, without permission of the Board of Health, is subject to fine and imprisonment. These are all obviously direct regulations of trade, and so is the whole of every quarantine system."

The Attorney-General (Mr. Wirt) for the appellant, differing from Mr. Emmett as to the character of quarantine laws, and viewing them with Mr. Webster, as police and not commercial regulations, says (*idem*, p. 178): "With regard to the quarantine laws, and other regulations of police respecting the public health in the several States, they do not partake of the character of regulations of the commerce of the United States. It had been said that these local regulations were recognized by Congress, which had made them a part of its own system of commerce. But this recognition would have been superfluous, if they could have stood without it on the basis of State sovereignty; and so far as their adoption by Congress could be considered as affecting the question, the manner and purpose of the recognition operated the other way. It would be found that, by the commercial regulations which Congress had made, a general system was adopted, which, if executed in every instance, would have carried ships and vessels into all the ports of the several States, their local quarantine laws to the contrary notwithstanding. An express regulation is therefore introduced, requiring the collectors of the customs to conform the execution of their official duties, under the navigation and revenue laws, with the quarantine laws of the respective States. Without such a provision, the local health laws must have given way to the supremacy of the navigation and revenue laws of the Union."

Chief Justice Marshall delivered the opinion of the Court, and, referring to the arguments of counsel, drawn from the nature of the inspection laws, quarantine laws, &c., he says (*idem*, p. 203): "They form a part of that immense mass of

legislation which embraces every thing within the territory of a State, not surrendered to the general government : all which can be most advantageously exercised by the States themselves. Inspection laws, quarantine laws, health laws of every description, as well as laws for regulating the internal commerce of a State, and those which respect turnpike roads, ferries, &c., are component parts of this mass.

“No direct general power over these objects is granted to Congress ; and, consequently, they remain subject to State legislation.”

In the case of the *City of New York v. Miln*, Justice Barbour cites the opinion of the Court, just given. He says (*Peters' Reports*, vol. ii. p. 133): “And this Court, in the case of *Gibbons v. Ogden*, 9 Wheat. 203, which will, hereafter, be more particularly noticed, in speaking of the inspection laws of the States, says, they form a portion of that immense mass of legislation which embraces every thing, within the territory of a State, not surrendered to the general government, all which can be most advantageously exercised by the States themselves. Inspection laws, quarantine laws, health laws of every description, as well as laws for regulating the internal commerce of a State, and those which respect turnpike roads, ferries, &c., are component parts of this mass.”

These opinions, though incidentally called out, seem so fully to settle the question as to the source from whence quarantine laws must emanate, that, desirable as it would be to have a law, intended to act uniformly throughout the States, receive its origin and authority from Congress, we must yield to the necessities of the case, and, turning away from the national legislature, make an application to the legislatures of the States.

Heretofore it has been the custom in many, if not in most, of the States, for the legislature to delegate the powers they

hold over this matter to the cities. Under the impression that those most immediately interested would best consider the necessities of the case, weighing with all care their hygienic wants, yet not losing sight of the interests of commerce, the sea-port cities have been allowed to frame and set in motion their own laws. This arrangement had certain advantages so long as the imperfect means of transportation, which then existed, kept each port, to a very considerable extent, isolated from all others. It was very well for Charleston to relax her health laws, in the interests of her commerce, so long as, by so doing, she did not frustrate the efforts of her neighbor Savannah towards the exclusion of disease from her community, by means of stringent quarantine. The difficulties of transportation, in those days, rendered it easy for the one to guard herself against danger from without, while the other was welcoming, with open arms, disease, and even death, provided it came in the train of commerce. But circumstances are vastly changed now. The enchanter's wand, of the fairy tale, has been realized, and steam has assumed the functions of the wishing-cap of the fable. The man in Charleston, with an infected bale of goods, or an infected constitution, wishes himself and his merchandise in Savannah, and, almost as quickly as the thought is formed, the magic wand transports them, and the infection which was voluntarily introduced into the one is developed in the other in spite of her laws of exclusion.

It is, therefore, no longer a matter for each city to decide for herself. The time has come when the good of the whole should be worked out by the wisdom of the whole. The States must take this subject up again, and they must do so by a consentaneous action. It should no longer be allowed to one, for instance, to New York, to admit within her port a danger which she cannot confine to her own precincts; a danger which she will transmit, by steam, in every direction,

beyond her territory, with greater rapidity than she can diffuse it through her own streets and alleys.

The last question for us to consider is how the States can be approached with a reasonable prospect of obtaining their co-operation in this work.

The first step to be taken will be for the Convention to elaborate a law, so framed as to meet all the requirements of the case, while, at the same time, it places as few restrictions as possible on commerce. To effect this we propose that a committee be raised, to consist of one or more members from each State situated on the coast of the Atlantic Ocean and the Gulf of Mexico, or possessing a port accessible from either of these, with instructions to frame such a law for the consideration of this or a subsequent Convention. With the law thus prepared, and after its adoption by the Convention, it will be necessary to go before the legislatures of each State interested, and, using such influence as may be brought to bear, endeavor to obtain the passage of the law.

Such a law, going forth with the authority and influence of this body, cannot but have its weight with those bodies. And if proper persons, in each State, be designated by the Convention to attend the sittings of their respective legislatures, for the purpose of giving all requisite information, and exciting the proper degree of interest in the matter, by showing to the voters that the work has been approved of and aided by sensible and judicious men from among themselves, it hardly admits of a doubt that the plan will succeed.

But there is still another influence, not less powerful than that of the Convention, whose co-operation may be invoked in this work. An appeal may be made to the American Medical Association, at its approaching session, to give its aid to this measure. Should a plan, such as we have suggested, be adopted by the Convention, and a law framed, in accordance therewith, satisfactory to the representatives of the States and cities

most particularly interested, there can be no doubt that the Association would take the matter up, and unite with the Convention in furthering an object so entirely in accordance with its aims. It would be eminently appropriate for two bodies, laboring towards ends intended to subserve the cause of public hygiene, to co-operate in this important branch of the subject. There are difficulties in the way of the Convention, which can only be obviated by a concentration of all the influences that can, in any way, be brought to bear upon the public mind. Nothing short of a general expression of approval, from all right-thinking men, of the objects which the Convention has in view, and of the means it may devise and recommend for carrying them into effect, will stem the current of popular feeling in favor of a system of entire individual liberty of action in the pursuit of gain. If men in their search after wealth are to be restrained from seeking it in their own way, and without reference to the nuisances or dangers they may inflict on others, it must be done by bringing such a weight of intelligent and practical public opinion to bear upon them as may compel them to submit to the reasonable restraints of law. The time must come when those who trust to well-devised hygienic measures for the greatest practical improvement in public health, rather than to quarantine laws, will seek to have their views laid before the community, and their plans elaborated and utilized. The day must come when, even in our wide-spread and still sparsely populated country, the attention of the public will be drawn to the importance of enacting laws for the regulation of the dwellings and the personal habits of communities. It will then be seen that the steps now recommended by the Convention are only a few of the very first of those which will, in due time, have to be taken, in order to guard our constantly augmenting city populations from the consequences of their own aggregation. It is not too soon for the agitation of this vital question to begin in that important body. We cannot

doubt that an appeal to it will insure a hearty response and a vigorous co-operation.

And now let us, in conclusion, sum up, in a few words, what we have endeavored to illustrate by our preceding remarks.

1st. No system of quarantine laws can guard us against diseases which are capable of spreading themselves by any other means than pure contagion.

2d. The line of demarkation between contagious and non-contagious diseases is not so clearly defined as to enable us to say, of many of them, whether or not they may be controlled by quarantine laws.

3d. The difficulties in the way of enforcing quarantine laws in reference to vessels, cargoes, crews, and passengers, after these have entered our ports, are so great that it is hopeless to endeavor to effect any thing useful by the old plan.

4th. The only possible way of restraining the intercourse of the infected and the uninfected is by a total separation—by preventing the former from approaching the latter. To do this, the ports should be shut against the entrance of vessels, from places known to be suffering from infectious diseases to such an extent as to justify their being characterized as epidemics.

5th. As the forms of Yellow Fever originating in our cities are not supposed, by the contagionists, to be capable of reproducing themselves, it will not be necessary to observe the same rigidity of isolation in reference to the native, as to the foreign disease. The coastwise intercourse need not be as entirely suspended as the foreign.

6th. As the law which the Convention may recommend, will require to be of equal force in every State, and as it can only be enacted by the State Legislatures, it will be necessary, in

order to secure its passage, to have it so framed as to be acceptable to all; hence the necessity of intrusting it to a committee composed of members from every State concerned.

7th. In order to have the law laid before the public with all the prestige of high authority, it would be desirable to obtain the co-operation of the American Medical Association.

WM. T. WRAGG.

CHARLESTON, SOUTH CAROLINA
April 9th, 1859.

REPORT OF THE COMMITTEE

ON THE

INTERNAL HYGIENE OF CITIES.

Including Appendices B, C, D, and E.

INTRODUCTION

BY DR. THOMAS MILLER,

WASHINGTON, D. C.

At the second Annual Meeting of the Quarantine and Sanitary Convention, held in the city of Baltimore, in April, 1858, the following resolution, reported by the Business Committee, was adopted, viz.:

“Resolved, That a Committee be appointed to report on the Internal Hygiene of Cities, and present the same at the next meeting of the Convention, with particular regard to the following points:

“1. A complete and efficient system of registration of births, marriages, and deaths, with particular reference to cities, and the necessary connection of such a system with sanitary measures.

“2. Upon the subject of disinfectants, their character, effects, and benefits, in connection with sanitary measures.

“3. Upon the importance of an ample supply of water, an adequate sewerage, and the proper disposal of the offal of cities.

“4. Upon the importance and economy of sanitary measures to cities.”

In compliance with this resolution the Committee was appointed, consisting of

THOMAS MILLER, M.D., of Washington, D. C.

E. M. SNOW, M.D., of Rhode Island.

W. C. VAN BIBBER, M.D., of Baltimore.

R. D. ARNOLD, M.D., of Georgia.

JOHN H. GRISCOM, M.D., of New York.

HENRY G. CLARK, M.D., of Boston.

JNO. BELL, M.D., of Philadelphia.

Immediately after the adjournment of the Convention the Committee met, to devise some plan whereby a complete report might be obtained. The most practicable plan suggested during their deliberations—the one best calculated to promote the object for which the Committee had been appointed, and the one they selected—was to refer the several topics detailed in the resolution to the individual members of the Committee. By mutual agreement, then, the gentlemen were to have submitted to their Chairman separate reports upon all the subjects, in the following order:

E. M. Snow, M.D., on "A complete and efficient system of registration of births, marriages, and deaths," &c., &c. (First classification in the resolution.)

W. C. Van Bibber, M.D., on "Disinfectants," &c. (Second classification.)

R. D. Arnold,* M.D., on "Vaccination as preventive of variola, and the value of revaccination, with a view to the enactment of laws for the enforcement of general vaccination and revaccination."

John H. Griscom, M.D., on "Water, sewerage, offal," &c. (Third classification, &c.)

H. G. Clark,* M.D., on "Some detailed and specific plan for regulating the internal sanitary condition of cities, which shall embrace all the subjects which may properly come within the province of preventive medicine."

Jno. Bell, M.D., on "The importance and economy of sanitary measures to cities." (Fourth classification.)

As Chairman of the Committee, I deeply regret that all its members have not presented their reports; and at this late day it will be impossible for me to make other provision for

* The subjects assigned to Drs. Arnold and Clark were added to those specified in the resolution before quoted, by a vote of the Convention, at a subsequent period. The remaining topics are those embraced in the original resolution reported by the Business Committee.

the subjects submitted to the gentlemen who have thus failed. The report must therefore be incomplete.

The subject which is the first division of the resolution, viz. : A system of registration of births, marriages, and deaths, &c., and also the subject of vaccination and revaccination, with a view to its enforcement by legislative enactment, are unavoidably omitted from the report now submitted. The pressing engagements which have constantly occupied the time of Dr. Snow, who was to have reported on the former subject, have prevented him from preparing a paper ; and although nothing has been heard from Dr. Arnold, to whom was referred the subject of vaccination, &c., it is presumed that he too has been prevented from fulfilling his trust, by circumstances beyond his control. These topics are of the deepest interest to the Convention, as well as to the community at large, and the peculiar qualifications of the gentlemen who were to have submitted the results of their experience and investigation, makes the failure more to be regretted.

The separate reports upon all the other points of investigation, I am happy herewith to present to the Convention.

They have been prepared by the authors (whose names are attached to their respective reports) with great care and ability, and it is to the individual exertions of these gentlemen that the Convention, and the country, are indebted for the large amount of valuable material contained in their reports.

Had not the failures occurred to which I before alluded, and had the report of this Committee been presented complete, it would have better promoted the object of the Convention ; but, partial as it is, on it will doubtless be based a system of sanitary or hygienic regulations highly creditable to the gentlemen whose views are hereinafter expressed, and applicable not only to the larger cities and towns of our country, but also to the rural districts.

It is not my design, in this introduction to the report, to

enter into a discussion, either general or specific, of the subjects embodied in the detailed accounts which follow. Time would not permit me to do so, had I the inclination. But I cannot pass the matter by without a word of admonition, in regard to the necessity of reform in the direction the Convention is now looking. Let us take warning from the disastrous consequences which resulted from early inattention to this all-important subject of internal hygiene in the larger cities of the Old World. Let us endeavor to avoid those fatalities by the lesson there taught, and go to work in earnest and with system, before the same effects fearfully tell us, that we also have remained too long in idleness. Let us adopt measures to impress upon the public mind the importance and value of accurate and efficient registration; of the use of disinfectants; of suitable drainage; of the abundance of pure air and water; of encouraging vaccination, and the other sanitary measures which, in the wisdom of this Convention, have been brought forward for minute investigation. While we admit that much may be done by a properly regulated quarantine system, in the way of preventing and arresting the progress of pestilential diseases, we must not overlook the opinion of scientific and accurate observers, that more benefit may result from the proper observance and enforcement of internal hygienic regulations in our larger cities, than ever has resulted, or can result, from the unaided quarantine.

Pertinent to this point are the following remarks from Dr. E. D. Fenner, a distinguished physician of New Orleans, and high authority on matters of hygiene:

"The numerous experiments with quarantines for the last half-century, enforced by governments far more rigid than our own, would appear to show that the benefits to be obtained by such measures are extremely limited, and that they cannot be safely relied on to avert the disastrous effects of pestilential diseases; while the accumulated observations of wise,

patient, and philanthropic men, during the same period, appear to prove most evidently that wherever amelioration has been effected in the public health, it was mainly due to *local improvements in sanitary police*. It follows that such improvements are of vital importance to the public weal, and therefore demand the serious consideration of those who are intrusted with the reins of government. If it be right and proper to invest our rulers with the power to maintain peace and good order in society, to administer justice, punish crime, and defend the country against foreign invasion, is it not equally right that they should also have the power to search out and remove the causes of disease, and, as far as possible, to protect the people against the ravages of pestilence?

Most certainly it is. The fact is a plain one, admitting of no contrariety of opinion. But when we admit that so much benefit might result to the inhabitants of our country, by an improvement in, and the more rigid enforcement of, hygienic laws, and that it is highly proper for our rulers to protect the lives and health of the people from the devastations of epidemic, as well as endemic diseases, the question naturally arises: Is a reformation in this particular practicable? That many difficulties stand in the way, we must admit; and yet we trust there are none so formidable as to defy the teachings of science, and the enforcement of well-devised laws, in surmounting them. But what can the Quarantine and Sanitary Convention do in enforcing hygienic laws? It has no legislative authority to enact laws, nor executive power to enforce them; but it can do much in discovering where the fault lies, and in pointing out some remedy. The very first movement for promoting this desirable reformation devolves upon this Convention; and I am happy to believe that its members have no disposition to shun their duty and responsibility in the matter. It is for us to furnish a plan of practicable, systematic sanitary regulations, which will cover all the defects in the laws

upon this subject, as they now exist, and which will be, as far as possible, uniformly applicable to cities in all sections of the country.

I should have been glad to give a review, or synopsis, of the separate reports now presented to the Convention, by which it might be aided in the preparation of a sanitary code ; but it is now too late for me to devote to the subject the requisite time and attention ; and as the report of the Committee, as a whole, is incomplete, the synopsis would therefore be of less use.

When the Convention has adopted a plan, and recommended it to the authorities of the cities as the most perfect one which their delegates, as a collective body, could select, its duty will have been performed. But not so with the members as individuals. It becomes their duty to use every proper means, to urge upon the rulers and the people, the importance of adopting at once these precautionary measures to secure the population of our cities against the dreadful scourge of pestilence. As stated before in these introductory remarks, *the people* also—*the masses*—must be impressed with the danger of neglect and the blessings of action in this matter. They must feel the benefit to accrue to them individually, and then, instead of conferring with neighbors as to how far the health laws of a city may be violated without the perpetrator incurring the penalty of such violation, men will be found endeavoring, in every way, to co-operate with the law-maker and law-officer in abating nuisances, and enforcing sanitary regulations.

In the city which I have the honor, in part, to represent, the want of this co-operation of the people generally is sorely felt by the authorities ; and, as a result of the indifference of the latter in regard to action, they are daily suffering from causes which might easily be removed. Their complaints, however, are constantly heard about what they conceive to be the faults of others—the officers of the Corporation.

Appendix B.

REPORT UPON DISINFECTANTS.

By W. C. VAN BIBBER, M.D.

HAVING been honored by the Quarantine and Sanitary Convention at its meeting upon the 30th of April, 1858, in Baltimore, by the appointment, as one of a committee to report upon the subject of "Disinfectants, their character, effects, and benefits," I beg leave, in discharge of the duty thus assigned and accepted, to submit as follows :

In approaching the subject, your Committee determined not to compile an abstract of what has already been written, and was easily accessible to all, but if possible to present something new, or at least make some suggestions for future trials.

For this purpose we were kindly furnished, by Dr. Miller, the Chairman of the Committee, with a printed circular, showing the object of the Convention. This was addressed to scientific gentlemen in this country and in Europe, together with the following letter :

"DEAR SIR: I take the liberty of addressing you upon a subject which you will find sufficiently explained in the annexed circular.

"In order that I may make the report with some hope of increasing the information now before the world upon the subject of disinfectants, it is necessary for me to request the assistance of those distinguished gentlemen of science who have given especial attention to substances which may be used for this purpose.

"I would much have preferred that the duty had been given

into abler hands, but as it is, if in the course of a few months, I can find subject-matter sufficient for a report to my countrymen, it will be a pleasure to me to give to those who may furnish me with such matter, the most ample credit for their labors.

"If you can offer any suggestions, or give any information upon this subject, you will not only confer a favor upon myself, but also upon the body in whose behalf I act in soliciting the co-operation of your experience in the investigation of a subject of so much interest, and whose importance demands so much attention."

More than forty of these circulars were sent, twenty-two of which were addressed to surgeons of the U. S. navy, and six to the U. S. army surgeons. The remainder were transmitted to eminent scientific men of this country and in Europe. Circulars were also sent through the kindness of the bureaus at Washington, to the Governments of England, France, and Russia.

The Committee availed themselves of this mode of procuring knowledge of disinfectants, with the hope of obtaining thereby more original ideas than can now be found in the different encyclopedias and articles upon the subject, which are evidently a continuation the one of the other.

The following replies have been received :

1st. Letter from Campbell Morfit, M.D., of New York. (See Appendix A.)

2d. From Dr. Sheridan Muspratt, F.R.S., who referred the Committee, in an especial manner, to the article "Disinfectants," in his recently published, highly useful, and interesting Dictionary of Chemistry, as being "one of the most complete articles ever written upon the subject." Its length, as it appeared in the encyclopedia, of course precludes its presentation entire in this report. But we hope the fol-

lowing concise abstract which is appended, will be found interesting and useful. (Appendix B.)

8d. Dr. A. Tardieu, of Paris, sent to us, in reply, a pamphlet, entitled *Rapport sur la valeur comparative de certains Procédés de Désinfection*, for a translation of which into English, the Committee and the Convention are indebted to the kindness of Dr. Wm. Grier, U. S. N

The pamphlet is submitted entire. In the opinion of the Committee, its value does not so much depend upon the facts deduced, as upon the theories of the action of certain disinfecting agents, and for the minute detail of the manner in which the experiments were conducted. Believing, as we do, that science is yet upon the threshold of knowledge upon the subject, a study of careful experimentation is of the first importance towards our advancement.* (Appendix C.)

PROPOSITIONS.

From the answers received to our circulars, and from the nature of the subject, we would arrive at the following conclusions :

I. The "character" of disinfectants must vary according to a great variety of circumstances.

II. Each communicable disease has its peculiar "*materies morbi*," and its own terms of communicability.

III. The same being true for each epidemic and endemic disease, fair reasoning and analogy would preclude the supposition that there can exist in nature, or be secured by science, a general or universal disinfectant. As well might we expect to discover a "*panacea*."

* We were informed by Dr. W. Whelan, U. S. N., that a single report upon the nitrate of lead was the only paper upon the subject to be found in the Naval Bureau. No other replies were received which we were authorized to use.

IV. It remains to be proved whether deodorizing substances are likewise disinfectants proper.

V. Although facts in many well-known instances (as at Montfaucon near Paris) have shown that men living in the midst of decomposing animal and vegetable substances, and thus surrounded with offensive gases, are not thereby rendered unhealthy; and also that many well-substantiated cases are known of the most deadly epidemics and endemics prevailing, where neither the senses nor scientific investigations could detect any change in the surrounding air. But yet these singular phenomena should not, by their speciousness, induce the belief that offensive gases are not deleterious to mankind, and should not *be removed if possible*.

Propositions concerning classified diseases for which disinfectants might be used.

The registration reports of England classify causes of deaths under 107 heads, of which only 16 will admit of the application of "disinfectants," and your Committee deem it indispensable to enter thus practically and analytically upon the subject, as a general article upon "disinfectants." would be equally unprofitable, vague, and unscientific.

VI. It is sufficient to state now and here that the diseases fatal to any *considerable number of persons*, and by universal consent admitted to be communicable from the sick to those in health, are, variola (small-pox), typhus (ship, jail, or spotted) fever, and rubeola (measles).

Class 2d. Those also fatal to a considerable proportion of individuals attacked, but whose nature as regards their communicability from the sick to those in health is still a mooted point, are Cholera, Yellow Fever, Scarlet Fever, and some forms of Dysentery, Erysipelas, and Diphtheritis.

Class 3d. The communicability of parotitis (mumps); per-

tussis (whooping-cough); varicella (chicken-pox); the contagiousness of the venereal diseases, and scabies (itch,) is universally admitted, but none of these are frequently fatal when uncomplicated.

Plague and glanders are thus far but little known.

Propositions for Class 1st.

VII. Prevention of crowding, ventilation and cleanliness combined, are as certain a preventive (disinfectant) of typhus fever, and *perhaps* of cholera as vaccination and re-vaccination are of small-pox. For rubeola (measles) no disinfectant as yet is known.

VIII. It is well known that the poison of epidemics is not perceptible to the senses, nor, as yet, to science. This is true for Influenza, Cholera, Rubeola, Epidemic Variola, Parotitis, &c. There is a wide-spread, popular association between offensive noxious emanations and Yellow Fever; their exact relationship, *as cause and effect*, remains to be investigated.

It is true, much filth and offensive gases are to be found in many towns, and on ship-board, even in hot weather, without the production of Yellow Fever, and instances directly the converse as frequently occur.

Propositions for the 2d Class of Diseases.

IX. When a portion of the crew of a vessel, as a man-of-war, cruising in the Yellow Fever zone, and it may be whilst the vessel is anchored in a port where this disease then exists as an epidemic, are attacked with Yellow Fever, the rule adopted is to change the location of the vessel; that is, to put to sea. This change of location does not check this disease so certainly as is the case with some other disease. To account for this, one or all of five things must exist.

1st. Either the vessel contains within its circumscribed section of space, some air or articles holding the *materies morbi*

of the disease ; or, 2dly, Those having been poisoned by it whilst in the port, are variously affected as regards the period of incubation ; or 3dly, It is directly communicated from the sick, to those in health ; or, 4thly, The general atmosphere of the vessel is poisoned by the continued presence of the sick ; or, 5thly, It had a spontaneous origin in the vessel, and the local causes still exist ; or, *all these causes combined* assist in carrying on the disease. The same may be said for a merchant vessel. The same may be the case with a sea-board or inland city or town ; the motions of the atmosphere, and the flight of the citizens, corresponding in some measure to the change of location of the ships.

An agent which will destroy the poisonous atmosphere in the ship, if it exists, or which, being inhaled by those already poisoned, will destroy in them the poison, and which, being inhaled, will give to those not already poisoned, complete security against the disease, is unknown ; in a word, *a disinfectant for Yellow Fever is a desideratum.*

X. The admission and knowledge of the fact, that no disinfectant for diseases of this class exists, are at once the origin and the cause of the continuance of quarantine.

XI. Without arguing the question concerning the importability and communicability of Cholera and Yellow Fever, it is sufficient to say, that if such danger can be avoided by free ventilation or otherwise, mankind should have the benefit of the doubt.

XII. If the deliberations of this Convention are of any value, or more properly of sufficient value, to have their conclusions disseminated amongst the learned in every port upon this small planet, then we may expect to begin at the "*causa causans*," and render quarantine restrictions much less onerous than they have ever been heretofore, by a timely application of the *natural disinfectants*.

For this purpose, your Committee upon Disinfectants (concerning their effects and benefits to sanitary measures) would recommend the two following regulations :

1st. Let it be the duty of the officers of the port where a vessel is lading, to see that such vessel and freight are in a proper hygienic condition before she is loaded ; and let a certificate of this be a portion of the papers to be presented at the port of entry.

2d. Let the officers of the vessel show upon the log, the length of time which wind-sails were set to ventilate the hold and every part of the vessel ; the amount of canvas used for such wind-sails, and the force of the wind whilst they were set.

These data, together with the condition of the vessel, crew, and cargo, upon arrival, will greatly assist the quarantine officers of the port of entry. This will be applying the great natural disinfectant of ventilation at the time, when, and as it should be applied.

XIII. For Scarlet Fever, Influenza, Parotitis (Mumps), Pertussis (Whooping-cough), and those forms of Erysipelas, Dysentery, and Dyphtheritis, which are believed by some to have a local cause in the imponderables, your Committee have no reliable disinfectant to offer.

Propositions for Class 3d.

XIV. For the Venereal diseases, the laws of Quarantine cannot be enforced, although for this country (America) and the South Sea Islands, they are greatly needed. But for domestic disinfection, your Committee would call attention to the increased facilities for vaginal irrigation, with pure water, by means of the various convenient gum-elastic syringes. The use of these instruments is as easy as the opening and shutting of the hand, and they pour a continuous stream of water into the very focus of contagion.

XV. Scabies (Itch) should be a disease for quarantine investigation at every port throughout the earth where immigrants arrive; and no better disinfectant is known than the external treatment by sulphur, according to medical laws and principles. These, of course, demand hospital means, and appliances, and delay.

Concerning plague and glanders we decline offering any suggestions.

PROPOSITIONS CONCERNING THE DISINFECTION OF THE AIR
WITHOUT REFERENCE TO SPECIAL DISEASE.

I. The only plausible theory to account for the phenomena of epidemic diseases is, that their causes exist, in what is known in physics, as the atmosphere. Allowing for currents, and for the rise and fall of the atmosphere from alternations of heat and cold, the best authorities suppose that terrestrial animals make use of a stratum of it in sustaining life, to the height of from sixty to two hundred feet.

Can this area be disinfected?

The idea at first seems almost an abstraction, yet facts prove conclusively that, in some instances, it can. Facts do not go so far as to prove this directly in the case of epidemics proper, but they do in the instance of a class of diseases known in the etiology of medical science as "miasms," of which Remittent and Intermittent Fevers are the effects, and cultivation, or the building of towns, with drainage, the natural disinfectants alluded to. This should at least be encouraging for the future, and would lead us to ask again: Can this area be disinfected within certain bounds, say, for example, five miles square? This would cover the area over which the poison of Yellow Fever was spread in Norfolk in 1855. The average motion of the atmospheric air being only about six miles per hour, would favor the practicability of this idea, provided a proper disinfecting agent was known. But we

would not have it prominently advanced that the use of disinfectants, as destroyers of poison, should always be held secondary to the prevention of disease. Preventive medicine consists in the anticipatory employment of the natural disinfectants. (See Appendix B. Abstract from Mr. Muspratt.)

II. The salubrity of air of towns differs from that of the country as 22 differs from 34. That is, where an individual has the chance of obtaining the age of 22 years in the air of a town, he would have an equal chance of living to the age of 34 years in the air of a salubrious country residence. The same comparative difference exists in vegetable life.

III. The impurities thus far found in the air of towns are (according to Dr. Angus Smith), an increased quantity of carbonic acid, to the amount of 0.049 sulphur acids, an absence of ozone, increased acidity, and a greatly increased amount of organic matter (an increase in Manchester, England, according to the same authority), as 9 is to 22.

IV. It is not to be supposed that this difference of the atmosphere of towns, from its condition of estimated purity in the country localities, is not a mode of infection upon a large scale, nor is it unreasonable to hope that science may be able to find some disinfectant.

V. Planting trees and increasing the amount of vegetable life in towns, may act favorably in decreasing the excess of carbonic acid. An admixture of lime with the burning coal, where this is used in great excess (as in Pittsburgh), may remedy the escape of sulphur acids. But your Committee are indebted to Dr. Angus Smith for this idea, and, like himself, we must end with the mere suggestion, leaving future observations to test its usefulness. The increased acidity of the air of towns is supposed to depend, in great part, upon the sulphur acids.

VI. Dr. Morfit's letter concerning the manner in which ozone may be used as a disinfectant, as well as how it may be formed in a small way, is suggestive. But observations upon this substance are still *in limine*.

VII. It is to remedy the vapors containing organic matter, for which disinfectants have been principally sought.

When we reflect that every cess-pool, privy, alley, filthy vacant lot, garbage cart, or vessel containing garbage, is constantly adding to the amount of organic matter in the air of a town, it is clear that the evil is to be remedied by speedy removal of these things, and increased facilities for washing the surface clean with pure water.

But it is impossible to remove them immediately, either in towns or from on board ships. Hence the necessity for disinfectants.

PROPOSITIONS CONCERNING DEODORIZERS.

I. Your Committee do not hold that these substances which absorb or alter offensive gases, are on that account disinfectants (according to the definition given), yet in the medical police of large cities, a cheap deodorizing agent for night-soil, and street-soil, is greatly needed, if not absolutely for the health of the citizens, at least for their comfort. And as almost always happens, places of deposit of these matters are, for convenience, made at all points of the compass around cities or towns, it follows that as their gaseous emanations are wafted back into the inhabited districts according to the direction of the winds, therefore any substance which will retain or change these offensive gases, must be acceptable as an article of comfort, if not of health.

Articles which are cheap will always, for this purpose, have a preference.

Your Committee have not personally experimented with

coal-ashes, but we would suggest this article upon the following authority :

Dr. John Fonerden, having charge of the Maryland Hospital upon the outskirts of the city of Baltimore, was much annoyed by the odor from several places of garbage and night-soil, immediately in the neighborhood of the hospital. Having complained to the Board of Health, he induced them, upon several occasions, to make a personal inspection of these places of deposit. At the time of their visit they were completely inodorous. Dr. Fonerden found that the men were constantly on the alert to find out when the Board were about to make their inspection. They would then cover the pits with coal-ashes, and the deodorization was complete.

Thomas Baynes, at Harris' creek, near Baltimore, manufactures *poudrette*, &c., from night-soil, street-soil, dead animals, &c. He receives at his place of deposit, 100 cart loads per week of night-soil, buys street-soil from the city to the amount of 300 loads per week.

He has experimented with deodorizers.

According to him, *muriaic acid* is a complete deodorizer, but is too expensive.

Sulphuric acid, in the proportion of 1 part to 100, is a feeble deodorizer, and also too expensive.

Lime does not deodorize.

We were shown a sample of his *poudrette*. It had no unpleasant smell.

It consisted of night-soil mixed with coal-ashes and charcoal. The charcoal he obtained from the whiskey refiners, at a cost of from \$1 to 50 cents per cart-load. He dries the charcoal before using it. These are the proportions used: to three cart-loads of coal-ashes, add one of charcoal; to fifty cart-loads of night-soil, add one cart-load of the above mixed coal-ashes and charcoal.

He thus returns to the land what would otherwise be lost.

The sales from his establishment amount to \$23,000 per annum; nothing being used but what is thrown in waste from the city. Thus, coal-ashes, now a useless and waste article, may be turned to great value in and around large cities and towns where coal is used as a fuel. It is rejected by agriculturists, and is used in no branch of manufacture; consequently its only cost is that of securing and transportation. By preserving it dry during the winter for use in summer, it would have the great advantage of cheapness over any other deodorizing (disinfectant?) article now in use.

II. The sawdust, from pine wood especially, and from other woods in a less degree, has the property of absorbing and retaining the ammoniacal gases, and we have found it of great advantage and comfort, for this purpose, when used in stables in large cities. Since it has come somewhat generally into use for this purpose in Baltimore, its price has advanced from 0 per cart-load to 75 cents.

There are a great number of patent deodorizing agents which answer a good purpose, such as Coutaret's, now being experimented with in New York, and about to be experimented with in Baltimore; and Prof. Darby's, which has a great celebrity in Alabama, where it is manufactured, and many others to which our attention has been called. But as they are being pushed forward to public notice by their inventors, and as many of the constituents of disinfecting substances, as well as their principles of action, have been so ably explained in the articles herewith submitted from the accomplished chemists, Drs. Morfit, Muspratt, and M. Tardieu, we will refrain from further comment and proceed at once to a few

CONCLUDING PROPOSITIONS.

I. Skepticism upon this, as upon many other subjects of an obscure nature, is to be avoided. Simply because a solu-

tion does not meet every requirement, it is not proper, therefore, to check inquiry, and view the entire matter as useless.

It is by disseminating what is known, as well as by a candid avowal of what is unknown, that science may expect to eradicate many injurious practices and superstitions.

The burning of tar in the ill-ventilated steerage of the steamer *Austria*, was the cause of death of many valuable persons, and the means thus employed is pronounced, by an advanced science, to be as useless as, in this dreadful catastrophe, it proved dangerous and fatal. There is no good or rational project, based on the best experience, that does not struggle against prejudice, vague theories, and ignorance, before the world at large can secure the benefit of it.

II. In this report we have endeavored to present the subject of disinfectants from the point of view from which it is observed by the chemist; that is, those who, by chemical laws, explain the changes which take place in gases or vapors, not recognizing the difference between deodorizers and disinfectants; and secondly, from the stand-point of the physician, suggesting the difference which should be drawn between deodorizers and disinfectants of disease.

The desire of your Committee has been to cover the whole ground. 1st. To state briefly what is known; and 2dly, to draw attention to points which are important, and not yet settled by science.

III. If the distinction between the deodorizers of offensive gases, and disinfectants of disease be a proper one, future experiments will be conducted upon a new basis.

APPENDIX TO THE REPORT ON DISINFECTANTS.

A.

LETTER IN REPLY FROM CAMPBELL MORFITT, M.D.

CHEMICAL LABORATORY, No. 19 EAST TWELFTH STREET,
NEAR UNIVERSITY PLACE, NEW YORK, Feb. 5, 1859.

DR. W. CHEW VAN BIBBER, and the Members of the Sanitary Committee
of the United States Quarantine and Sanitary Convention :

GENTLEMEN—The following notes are offered as a reply to
the circular which you addressed to me several months ago :

As the subject of disinfectants bears directly upon those conditions of the atmosphere which involve the necessity of sanitary measures, it becomes me to preface this paper with a reference to atmospheric air in its normal constitution, that being the prime medium through which disease is propagated by molecular and gaseous poisons. Chemists have determined this constitution to be of oxygen 23.015, and nitrogen 76.990 parts by weight, together with three to six thousandths of carbonic acid, and a proportion of aqueous vapor varying with the location and meteorological circumstances. Except from accidental causes, and which only produce a deviation from these proportions within narrow limits, the air, in its integrity, is uniformly of the same composition as above expressed. So long as this constitution remains undisturbed, atmospheric air is wholesome and invigorating to animated nature, and in itself a powerful disinfectant of vitiated air. But when, on the other hand, matters distinct from its normal constituents are sensibly present, they depreciate its healthfulness and purifying qualities. Ozone, however, which is more or less developed by certain electrical changes, is not to be considered

a foreign element, but an allotropic condition of the oxygen. Indeed, it is truly normal to the extent of one ten-thousandth part; and in that proportion, as will be noted hereafter, it augments essentially the healthful influence of the atmosphere.

The vitiation of atmospheric air is produced by various agencies; and upon the kind and degree of this vitiation its unfitness for human respiration depends.

Foul air has several prime sources. One is in the overcrowding of apartments, by which means an accumulation of carbonic acid gas takes place, while, at the same time, organized matters are exhaled from the person through the lungs and skin; and these are particularly poisonous when the person is diseased. Another source is the putrefaction of organic matters. When animal and vegetable matters are exposed for a certain period to moist air at warm temperatures, putrefactive fermentation is induced, and such products as water, carbonic acid, carbureted hydrogen, sulphureted hydrogen, phosphureted hydrogen, hydrosulphuret of ammonia, and bisulphuret of carbon are evolved, together with highly organized molecules, which, in their extreme development, are most probably animated. In hot and warm climates, they always exist to a greater or less degree in the air of the chambers of the sick, and of the dwellings of the untidy lower classes. They result, too, from personal uncleanness, the accumulation of offal, the stacking of putrescent matters in cellars and streets, from stagnant waters, and from imperfect drainage. All are injurious in their effects upon the human system; but those which most promote disease are the organized molecules, the sulphureted and phosphureted hydrogen gases, and the hydrosulphuret of ammonia. In a general sense, they are termed collectively miasm; and if, as happens in certain instances, there should be no accompanying odor, to herald the miasmatic presence, it exerts its mysterious power upon human health in the most insidious manner.

The miasm, so noxious *per se*, acts also as a ferment, and however it may have originated, has the faculty of operating upon the contiguous atmosphere, and producing such a catalysis or change in the elements of that atmosphere, as to give rise to an infection. The air of hospitals, of ships, and ill-ventilated apartments, from being contaminated with the breath and emanations of the inmates, is especially sensitive to this catalysis, and from such causes the diffusive power of the poisonous molecules may render a local disease general.

To disarm the atmosphere of this influence for evil, we must remove the miasm, or pabulum by which it promotes disease and widens the sphere of its virulence. This is to be accomplished by attacking it with agents which will transform it into innocuous products. Such agents are chemical, and styled disinfectants, because they wholly transmute the poisonous miasm, whereas, deodorizers, in contradistinction, such as empyreumatic and essential oils, fumigations and the like, merely mask the bad odor without reaching the true spirit of evil which may pervade the air.

The sulphureted and phosphureted elements of the miasm constitute effluvia, and though very injurious to health, are doubtless secondary to the organized inodorous portion in their baneful influence. Consequently, no disinfecting substance is fully efficient which does not destroy or substantially modify the latter, and, at the same time, decompose and deodorize the former.

For that reason, with the exception of Labarraque's liquid, the substances which, from time to time, have been proposed as disinfectants, do not wholly accomplish the object, since the decomposing action which they exercise is restricted to the effluvia. Thus, for example, Le Doyen's liquid (solution of nitrate of lead) abstracts the sulphur and phosphorus of the gases, and consolidates them as inodorous sulphuret and

phosphuret of lead, while the nitric acid eliminated from the lead salt, combines with the ammonia, and fixes it as inodorous nitrate of ammonia.

Burnett's liquid (solution of chloride of zinc) is even less efficacious in one respect, since its action does not extend to the free or uncombined sulphureted hydrogen gas. It has, however, eminent antiseptic properties, and arrests putrefaction even more promptly than nitrate of lead, when the decaying substance is brought into immediate contact with it. I use the term antiseptic in its true technical sense, as designating those agents which, while preventing putrefaction, and even arresting decay when it has begun, do not by their action effect the chemical decomposition of the substance.

Ellerman's fluid (a mixture of perchloride of iron with pyrolignite of the sesquioxyd of iron) acts like the preceding liquids by decomposing the sulphureted gases. The pyroligneous acid, being antiseptic, imparts that quality to the compound which it forms with the oxyd of iron.

Caustic (slaked lime) is rather a deodorizer than a disinfectant, though, in a measure, it plays also the role of the latter. It absorbs and neutralizes the carbonic acid and sulphureted and phosphureted hydrogen, and by its antiseptic properties retards and even arrests putrefaction. On this account, it is a cheap and useful agent for admixture with animal and other matters in a state of putrescence.

Charcoal is eminently antiseptic, and to a certain degree it exerts also a disinfecting power. This latter is owing to the porosity of the charcoal, which gives it a very great capacity for absorbing gases. Hence its direct action is only mechanical; though when miasmata become stored in the pores of the coal, there is a secondary and chemical action promoted by intimate contact of the former with the air condensed also by the charcoal. In this way energetic oxydation

of the mephitic contents of the coal ensues to a greater or less extent. The charcoal itself exerts no decomposing or chemical action; for, if after having absorbed the miasmata, it is gently heated, within a reasonable interval, they are given out unchanged. On this account charcoal, though it may justly hold a leading rank among deodorizers, cannot be considered as really deserving the high reputation as a disinfectant, which many chemists seem disposed to concede to it. Yet, alone, and as a deodorizing admixture for fecal matters, it performs a faithful service, while it is very useful even in infected atmospheres, when employed as an auxiliary to ventilation or chlorine.

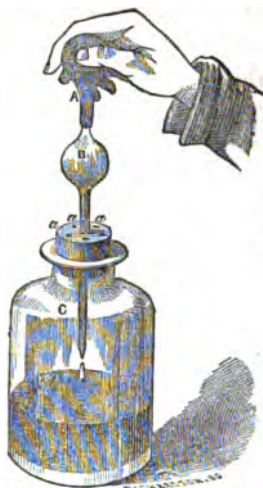
A neat though comparatively expensive preparation, which possesses great advantages as a deodo-disinfecting agent, is the per manganate of potassa, $(\text{KO}, \text{Mn}_2\text{O}_7)$. It gives off its abundant store of oxygen most freely to organic matters, and many kinds of gas, and destroys them without leaving any odor. It is only necessary to expose it in thin strata of damp powder upon broad plates, and to renew it as soon as its original purple-red color becomes black. Its oxydizing action upon the infected atmosphere is exerted with remarkable promptitude. Dr. Smith, of London, has proposed the use of this salt as a means for measuring the quantity of putrescible matter in the air, and the instrument for the purpose, he calls a *sepometer*. It acts simply in showing how much of the per-manganate is decomposed by a given volume of air.

Of all disinfectants, that which holds a foremost rank, except, perhaps, ozone, is chlorine, either in the state of free gas, or combinations with soda or lime, as hypochlorites of those bases.

Chlorine acts not only chemically upon the gases produced but also upon the organized molecules of the miasm. From

both it seizes hydrogen, and thus kills the latter while it decomposes and deodorizes the former. Its penetrating quality enables it also to reach the miasm in the most secret recesses. In my own experience, I have known it to clear a typhoid atmosphere of its infection almost immediately. Its most familiar form is that of "chloride of lime," or "bleaching salt," so largely used in calico works and manufactures. Upon being spread out, it attracts carbonic acid from the air, and that acid, in combining with the lime to form carbonate, causes the gradual development of chlorine. Labarraque's chlorinated liquor is a corresponding salt of soda, and a much more elegant compound, which gives off chlorine by the same rationale as the bleaching salt. A dilute solution of either forms a most efficient liquor for washing infected clothing. The objections to be urged against the use of chlorine in the chambers of the sick on account of its irritating action upon the respiratory organs, are scarcely tenable when the hypochlorites are the sources from which it is evolved; then it is given off too feebly and slowly to be deleterious in that aspect. Indeed, in the febrile atmosphere of certain of the hospital wards, injurious exhalations accumulate so rapidly, that it becomes indispensable to generate the gas in larger quantity. To accomplish this economically, with the least inconvenience to the health and personal comfort of the patient, hydrochloric acid is made to fall upon the common black peroxyd of manganese. The latter decomposes the former, by abstracting its hydrogen and eliminating gaseous chlorine. A very simple form of apparatus for this purpose, and which is, as near as may be, self-acting, accompanies this report. The annexed drawing too will explain its mode of operation, and show that the evolution of the gaseous chlorine is completely under control.

C is the bottle which contains the oxyd of manganese. Passing into it, through the cork stopper, is a glass pipette. The bulb, *B*, of the pipette holds the hydrochloric acid. By pressure on the cap *A*, which is of india-rubber, the air within is condensed, and on dipping the end of the pipette into the acid, and then removing the hand from the cap, the bulb becomes filled. In the same way, when it is required to put the apparatus into action, it is only necessary to press gently on the cap. The acid falls dropwise on the manganese, and the chlorine thus generated escapes into the air through the holes, *a a a*, in the stopper.



In all cases, however, a most indispensable and potent auxiliary to disinfecting substances, is ventilation. Indeed, in ordinary instances, it alone, suffices; for by keeping the miasm sufficiently diluted with constant accessions of pure air, its tendency to harm is neutralized.

Pure air exerts a twofold action; first, mechanically by its currents in dispersing the miasm, and, as above mentioned, in preventing its becoming concentrated; and second, chemically, by means of its oxygen and ozone. The latter is powerful in its effect upon the organized and gaseous poisons of the atmosphere.

Atmospheric ozone is oxygen electrified. It is a subtle invisible substance, which betrays its presence, when concentrated, by a pungent and peculiar disagreeable odor. It is produced, naturally, in the air during a thunder-storm, and whenever an emission of the opposite electricities occurs. So

also it may be made artificially by bringing together oxygen and electricity in their nascent state, as will be described presently. It is said to be the means by which the natural equilibrium of oxygen in the air is maintained against the disturbance which would otherwise be induced by respiration, combustions, and oxydations, generally going on upon the surface of the earth. One very interesting fact with regard to it, as a disinfectant, is its usual absence from inhabited dwellings, hospitals, and badly ventilated apartments. Moreover in malarial districts it is said the air is either wholly deficient in ozone, or else contains it in the least appreciable quantity. It must be marked, however, in qualification of its beneficial meteorological influences, when existing in the air in the normal amount before given, that it begins to assume baneful properties as soon as it attains to double that proportion. Indeed in its very concentrated form, it is highly inflammatory in its action upon the mucous membrane, and otherwise deleterious to the human system. A means of detecting its presence and measuring its constant intensity in the air becomes therefore very desirable, and that we have in the recently devised ozonometer of Dr. Lankester. This instrument consists of two small rollers inclosed in a box, and moved by a clock work arrangement; a strip of smooth paper prepared by saturating it with a solution of iodide of potassium and starch, is made to revolve over the roller to the length of an inch per hour. Twenty-four inches pass over in a day, and thus register, by the color acquired on exposure, the intensity of the ozone influence for every hour. An average can be deduced from the maxima and minima tints.

The rationale of the behavior is as follows: The ozone acting upon the iodide of potassium sets free the iodine, which in its turn, reacts upon the starch, and imparts the characteristic violet-blue coloration. As standards of comparison, there should be a chromatic scale, or graduated series of tinted

papers, each representing a certain proportion or degree of ozone, as predetermined by careful tests and observations.

The test paper should be exposed in the shade, and out of the way of volatile exhalations; for these latter, and the sun's rays, cause false indications. So too, the traces of nitric acid, generated in the air at certain times, and under certain meteorological conditions, might prove a like source of error. It is for these reasons that Houzeau is now making the subject his special study, with the view of devising an ozonoscopic method which will be free from objection; and results already published by him show that complete success will soon reward his labors.

When the instrument indicates a deficiency of ozone, as it may do in the apartments of the sick, the sign naturally suggests the propriety of using a remedy. This remedy is not difficult to be applied, for it is only necessary to pour some water into a broad and shallow plate, immerse sticks of phosphorus to half their length in it, and leave the whole exposed in the apartment to be disinfected. As the vapor of the phosphorus is given off, it combines with a part of the oxygen of the air, becoming hypophosphoric acid, which is immediately absorbed by the water; and the disengagement of electricity, incident to the chemical combination, produces the ozonization of the remainder of the atmospheric oxygen. The ozonometre will show when a sufficient quantity has been generated.

In conclusion, I must not omit to mention the freezing mode of disinfection, now so much in vogue for purifying ships, and which, more properly, should have been discussed when I treated of ventilation. It is a tedious, inefficient, and expensive method; tedious because it requires at least a month, inefficient on account of its imperfect action, and expensive for the reason that a very considerable consumption of ice is indispensable.

A reduction of the temperature to a low degree does not

permanently affect the effluvia or organized molecules of the mephitic air. Whatever action does take place is only temporary; for putrefaction and animation are merely suspended by the intense cold produced; and when the quiescent particles awake from their repose on the recurrence of warmth, they may, other circumstances being favorable, resume their tendency to promote disease. It is more than probable that the good effect attributed to the use of ice in disinfecting ships, is justly due to the protracted ventilation which their holds undergo while empty, and during the long period of freezing cold to which they are subjected. Even under the most favorable circumstances, and apart from the considerations just noted, extreme cold is not always an antiputrescent, for Dr. Kane, in his last arctic voyage, observed that the flesh of the reindeer became sensibly tainted at a temperature as low as 4° F., and there are other similar instances on record. A positive disinfection and simultaneous deodorization can be much more readily effected, in less than a week, and at the cost of a few dollars, by the judicious use of chlorine gas, and solution of lead salt.

Respectfully submitted by,
Your obedient servant,
CAMPBELL MORFIT.

B.

ABSTRACT OF THE ARTICLE "DISINFECTANTS," IN THE CHEMISTRY, THEORETICAL, PRACTICAL, AND ANALYTICAL, AS APPLIED AND RELATING TO THE ARTS AND MANUFACTURES.

By Dr. SHERIDAN MUSPRATT, F. R. S. E. Vol. I. p. 556.

Antiseptics and deodorizers are included in the enlarged signification of the word "*disinfectants*." Burning dead bodies and other substances, drying them by means of heat,

or washing with pure water, were among the earlier important methods of disinfection.

No infection is known without the presence of some putrefying agent. It is from this "stand-point" that a view of the opposite, or disinfection, is taken.

A state of the atmosphere in which organic matter does not exist can scarcely be imagined, and has never been found. When this organic matter comes from healthy bodies, it is found to be injurious if allowed to collect; when emanating from unhealthy bodies, it *must* communicate disease much more readily. Solids and liquids, when causing diseases, must be removed; but it is against vapors that the use of disinfectants is to be principally directed.

Acids and other substances were used as disinfectants before ventilation. After ventilation was used, it was proposed to medicate the air intended for respiration.

Innumerable facts show that disease really arises in and around dwellings and ships. The last chapter in the history of cleanliness has been by no means arrived at; the subject seems to grow as civilization advances; and as man becomes more intellectual and refined in his organization, he appears to suffer most from its neglect.

Natural Disinfectants.—The atmosphere is a great disinfectant, partly by its removal, with its currents, of contaminating matter, and partly by its power of oxydation. In ventilating, it is advisable to admit only the purest air. It is generally safer to take air into a building from an elevation of ten or fifteen feet; or, if taken from lower elevation, especially not to contaminate it by drawing it through a damp cellar or from the back of the house.

Water is the next great disinfectant employed by nature. Being essential to eremacansis, it is likewise the greatest corruptor. It is a disinfecting agent by the simple act of washing. Each shower of rain brings down floating organic sub-

stances and diffused gases. It is the only fluid that will communicate to the skin the feeling of freshness ; so much is this generally esteemed, that it stands in the language as a very type of vigor and beauty. Each stream and river removes its tribute of substances capable of decomposition. The ocean bears the decaying material further from land, mingles it with purer water, washes it, dashes it about in the air, and thus produces oxydation and purification. In all cases where water will remove the soil, it ought to be regarded as the most agreeable and efficient disinfectant.

Soil is another great disinfectant, and, in conjunction with air and water, is the most efficient of all. Organic and putrid substances sink into its porosities in solution, and mixed with air, and thus become forcibly oxydized. Water impregnated with every impurity, in sinking through it, is filtered, and is only deleterious where the abundance of animal matter is more than can be acted on by the soil.

Light is another natural disinfectant. It gives life, but in what manner no one can say. Air, water, land, drainage, and light are disinfectants, to a great extent, under the control of man.

Heat and cold are likewise disinfectants, partly natural and partly artificial. Albumen coagulates at 140° F., and the ice-buried animals of the north show the antiseptic properties of cold.

The artificial production of extremes of either may be used as disinfectants.

Artificial Disinfectants.—Acids are preservatives of organic matter ; pyroligneous acid very much so.

Tannic acid and other astringent substances are disinfectants.

Charcoal, as an absorber of gases, is a disinfectant, of which wood-charcoal has the highest absorbent power. It is likewise a powerful oxydizer of gases. It should not, on this

account, be mixed with substances intended for fertilizers. These principles of action recommend it to extensive use where the evolution of gases is the source of impurity.

Gum resins (of which camphor has been most strongly recommended), benzoin, storax, olibanum, amber, mastic, cascarilla, and other bodies of similar nature, have been used to some extent as disinfectants. Their theory of action is unknown, and efficacy doubtful.

Sugar is an antiseptic, as is shown by its preservation of fruits and meats.

Any thing which excludes the atmosphere is a preservative from decomposition, and hence a disinfectant.

Metallic salts are disinfectants. The nitrate of lead (Ledoyen's), chloride of zinc (Sir William Burnett's), chloride of manganese (Mr. James Young's), sesquichloride of iron (Ellerman's), chlorinated lime or soda (Labarraque's), have all been usefully employed as disinfectants, and have virtues, as such, as chlorine compounds.

Chlorine, when used as hypochlorous acid, is more energetic.

Chlorine, by liberating the nitrogen in a gaseous state, by breaking up albuminous, ammoniacal, and cyanogen compounds, prevents eremacausis, and thus acts as a disinfectant.

Nitrous acid (Dr. Carmichael Smith), sulphurous acid (Dr. Angus Smith and Mr. A. McDougall), variously compounded with salts of magnesia and a few per cents. of carbonic acid, being a fine, white, dry powder, is, in the opinion of Dr. Muspratt, doubtless far superior to any disinfectant hitherto fabricated.

C.

REPORT ON THE COMPARATIVE VALUE OF CERTAIN METHODS
OF DISINFECTION.

By MM. TARDIEU and CAZALIS.

The Director of Public Aid, having been solicited by two manufacturers of disinfecting fluids, determined, in 1856, to appoint a committee to make experiments at the Salpêtrière, upon the comparative value of their compounds. This Committee, originally composed of MM. Bouchardat, Maipenet, and Tardieu, was afterwards modified by the introduction of M. Cazalis in the place of M. Maipenet, who was called to duty in another hospital, and of M. Fermond in the place of M. Bouchardat, who, overloaded with numerous occupations, could not attend to the experiments with all the care that was desirable.

The two liquids which were to be submitted to these comparative trials, were, 1st, the disinfecting fluid of M. Ledoyen, and 2d, the antimephitic liquid of M. Larnaudés; but we may here state that we were able to compare them simultaneously with the method of disinfection of M. Krammer, already for some time in use at the Salpêtrière, and with the best disinfectant of all—chlorine, in combination with the alkaline bases of lime and soda.

Before entering upon the details of the experiments which we made, it is proper to premise, that the number of substances which have been tried as disinfectants is very considerable; that empirics, without any knowledge of chemistry, have composed the most heterogeneous mixtures, quite incapable of attaining the object they had in view; that some of them only attempted to conceal offensive odors by the use of volatile or aromatic substances, whilst others made use of gummy and fatty materials, which, being spread over in-

fectious matters, confined the volatile substances contained in them, and hindered them from spreading in the atmosphere: and, finally, that scientific chemists, who understand that it was necessary to decompose offensive or deleterious emanations, are the only persons who have rendered real service to public hygiene.

We will not here give a history of all the methods, patented or not patented, which have been proposed as means of disinfection. We will confine ourselves to stating in a general manner—

1st. That the volatile acids—nitric, muriatic, acetic, &c.—may in some cases act efficaciously by neutralizing animalized ammoniacal matters. They have often been successfully employed in purifying large inhabited buildings.

2d. That nitrous and sulphurous acids produce excellent effects, in certain cases, by deoxydizing organic substances.

3d. That chlorine and the alkaline hypochlorites, the best disinfectants known, decompose all organic matters by uniting with the hydrogen which they contain.

4th. That the alkalies—such as potassa, lime, soda, ammonia, &c.—act by their power of neutralizing the carbonic and hydrosulphuric acids, and, perhaps, other volatile organic acids whose composition is unknown.

5th. That certain soluble salts whose metallic bases have a strong affinity for sulphur, and form insoluble sulphurets, act efficaciously upon sulphureted hydrogen and the hydrosulphuret of ammonia, both of which are very deleterious.

6th. That in all cases ventilation is indispensably necessary, whatever means be employed.

Since the discovery of chlorine, it may be truly said that no new disinfectant has been found; for all the methods put in practice since that epoch are evidently applications only of

principles long before known to chemists, and are limited to the neutralization of ammonia, and the decomposition of hydrosulphuric acid gas, and the hydrosulphuret of ammonia. For this reason, the soluble salts of iron, zinc, copper, manganese, and lead, or even the oxyds of these metals, which are very cheap, have been lauded with almost equal success. But, it must be observed that, in this respect, the salts are superior to the oxyds, because the latter are altogether incapable of saturating any ammonia, either already formed or resulting from the decomposition of the hydrosulphate of ammonia. On the contrary, the acid of the salt being capable of neutralizing the ammonia resulting from this decomposition, the employment of the salt is, in almost all cases, to be preferred; and yet even then, as we shall see farther on, the whole of the ammonia cannot be neutralized.

It would seem, at first view, that nothing could be easier than to compare a number of disinfectants, and decide which of them possessed the greatest efficacy. But when we enter upon a course of experiments, numberless difficulties are found, which ought to render us cautious in forming a decided opinion. These difficulties arise from the fact, that we possess no reagents capable of detecting odors, other than those of sulphureted hydrogen and ammonia; and that the sense of smell upon which we must rely for the detection of all others, cannot distinguish with accuracy, the numerous kinds and degrees of odors, nor appreciate clearly the changes produced in the air, by the use of different disinfectants. Then again, offensive odors are caused by so great a number of different substances, and their composition is so little known, that, setting aside sulphureted hydrogen, sulphuret of ammonia, ammonia, and a few others, our ignorance of their chemical nature may be said to be complete.

This difficulty, which is almost insurmountable, occupied our minds incessantly; but by varying our experiments, and

changing the circumstances in which they were made, we have arrived at a solution which, if not perfect, approaches at least as near as possible to the truth.

All our experiments have been made—

- 1st. Upon sewers and privies.
- 2d. Upon fecal matters.
- 3d. Upon the air of infected wards.
- 4th. Upon putrefying animal matters.
- 5th. Upon animal matters easily putrescible, but not in a state of putrefaction.

A. EXPERIMENTS UPON SEWERS AND PRIVIES.

For some time the privies and sewers at the Saltpetrière had been special objects of disinfection by the process of M. Krammer. This consisted of the application of a liquid, the basis of which was a salt of iron, and their condition was thereby perceptibly improved; but, nevertheless, it must be said that there were some privies, particularly those of St. Leon, so offensive, that persons who entered them were seized with a feeling of disgust which frequently caused nausea.

In this state of affairs we successively made use of the means which we are about to mention. But as these privies opened into a sewer which, starting from the Cour Lassy, crossed the St. Charles building in order to reach that of St. Leon, in passing before the church, we were obliged to include in our operations not only the sewer in its whole extent, but also all the privies which opened into it.*

Disinfection by Ledoyen's Liquid.

Ledoyen's liquid consists of a solution of about twenty-five pounds of the crystallized nitrate of lead in twenty-two gallons of water. This liquid marks 12° on the areometer.

* There are nearly 1000 persons in these buildings.

To effect the purification of the sewer and the privies opening into it, M. Ledoyen sent a man every day for nearly a month. This man expended daily upwards of two gallons of the liquid more or less diluted with water, which was used in washing the floor, seats, and basins, as well as the walls. Hence the liquid, in running down, spread over the interior and lower walls of the privies, and finally found its way into the sewer.

From the first day there was a perceptible improvement in the privies of St. Leon, and they could be entered without the feelings of disgust we have already mentioned. This improvement, however, did not last twenty-four hours; for, the operation having been performed between eight and nine o'clock in the morning, the good effects only lasted until five or six in the evening; more or less, according to the wind, state of the weather, &c. We may say that the method of M. Ledoyen is next best to that by the chlorides—the best of all those which we have employed.

The objection which has been made to this method, that it causes the formation of a certain quantity of sulphate of lead, which leaves a white stain upon the floors, is of little consequence, as the stain can be easily removed with a little pure water. Another objection, that it leaves a coating of black sulphuret of lead upon the metallic basin and other places, is equally trivial; but one much better founded is, in our opinion, its incapability of absorbing all the ammonia of privies—an important subject, which we will consider further on.

Disinfection by the Liquid of Larnaudés.

M. Larnaudés is the inventor of a liquid which he calls antimephitic, with which we made similar experiments. This liquid, whose exact composition has never been communicated to us, although frequently promised, appears to be formed of a solution of sulphate of zinc, to which a little sulphate of

copper has been added, in order to make it a patentable article. Now, neither the sulphate of zinc, nor the sulphate of copper, ought to be considered as a new disinfecting agent, for the sulphate of zinc had been employed as such long before M. Larnaudés, by Siret, Gagnage, Regnault, Solmon, &c., and the sulphate of copper, which was first used by Paulet, has the great inconvenience of being ten times dearer than the sulphate of iron, without its being more efficacious. But whatever may be its composition, M. Larnaudés had the same sewer and privies to purify as his competitor.* A man was sent every day for a month to effect the purification by means of his antimephitic fluid; and, although this was perfectly accomplished, the results which we observed were far less extraordinary than the persons who were interested in it asserted them to be. At the very outset, we perceived a serious inconvenience which Ledoyen's fluid did not present. At the moment when it was used, a metallic, coppery taste was perceived in the fauces, so distinct that persons ignorant of the composition of the liquid, readily recognized it. Besides this coppery taste, the styptic taste of the salts of zinc was also perceived, which the same persons compared to the taste of ink.

Although this taste was so distinct, and the sweet and astringent taste of the salts of lead was not at all perceptible when Ledoyen's fluid was used, it cannot be attributed to the greater volatility of the salts of zinc and copper. We are inclined to think that it was owing to the manner in which the fluid of Larnaudés was used. The person employed by him took particular care to sprinkle and diffuse the liquid as much as possible. Thus, it was observed that the walls were more freely moistened, and the floors, seats, and basins kept cleaner and better washed, than in the previous proceedings of M. Le-

* It ought to be remarked that Ledoyen's liquid having been previously used, their condition was not so bad.

doyen. Now, in this free use of the liquid, a certain portion of it was mechanically carried into the atmosphere by currents of air, and, entering the back of the mouth through the nostrils, produced there the sensation of metallic adstriction of which we have spoken.

It might be supposed that, after this extreme cleanliness, the liquid of M. Larnaudés would have had a more marked and persistent effect; but it was not so; for the purification having been completed between 8 and 9 o'clock in the morning, the offensive odor, which had entirely disappeared, returned anew about mid-day, or a little later. Now, we have seen that, with Ledoyen's fluid, the bad odor did not return until 5 or 6 o'clock in the evening. It appears, therefore, that the effects of Larnaudés's liquid last only four or five hours, and those of Ledoyen's, eight or nine hours, which is nearly double. The latter has also the advantage of being somewhat cheaper.

Experiments which were made in the privies of the Conciergerie, with Larnaudés' liquid, leave no doubt of the rapidity with which it destroyed the offensive odors prevailing there, but it must be added that the quantity of liquid employed was truly enormous.

Disinfection by the Hypochlorite of Lime.

Having always on hand the hypochlorite of lime (dry chloride of lime), we naturally thought of using it in the same places in which the liquids of Ledoyen and Larnaudés had been employed. With this view, about seven and a half pounds of the dry chloride of lime were mixed with ten buckets full of water. Four buckets full were then decanted in such a manner as to have the liquid sufficiently clear for washing the floors with out whitening them. The residue of the chloride, well mixed with the remaining six buckets of water, was thrown into the privies in such a manner as to spread over

their interior walls as extensively as possible. This proceeding was repeated daily for nearly a month. The results observed were, that, for the first few days, as soon as the liquid was used, a thick cloud of white vapor appeared, owing to the formation of a certain quantity of hydrochlorate of ammonia; but gradually this vapor lessened in quantity, so that in a few days it was scarcely visible. The formation of this vapor was above all extremely abundant in the privies of St. Leon, which we have said were the most offensive. In the course of a few days, however, the vapors there were not more abundant than in the other privies.

We may hence conclude, it appears to us, that although these places were purified, first, by the method of Krammer, second, by that of Ledoyen, and third by that of Larnaudés, they still contained, either in their atmosphere or in the stones or porous materials of their walls, a large quantity of ammonia, which the chlorine attracted or sought out, thus producing the muriate of ammonia above referred to; and that if afterwards, similar but less abundant vapors were observed, they were due to the fact that new quantities of ammonia were daily evolved. It consequently appears that, whilst the ammonia of the privies disappeared almost completely under the use of chlorine, little or none was absorbed by the disinfectants previously used.

In other respects, the effect was nearly the same as when Ledoyen's fluid was used; that is to say, when the purification was effected at 8 or 9 o'clock in the morning, the offensive odor did not return until 5 or 6 in the evening. The price of this disinfectant is somewhat less than that of Ledoyen's, and considerably less than that of M. Larnaudés'. But it is an important consideration that the odor of chlorine itself is quite strong; that it is even suffocating when it exists to any great extent in the atmosphere; that it is disagreeable to many persons, first, by an unpleasant odor, and then by its irritating

action upon the respiratory organs. Besides, it exerts a corrosive action on all the metals, and for these reasons it has fallen into disfavor as a disinfecting agent. We think, however, that with proper care, it may be employed so as to avoid, in a great measure, all those inconveniences.

We must not omit the following fact, which we regard as conclusive. During the time that the purification of the privies and sewers was going on, by the three methods of Krammer, Ledoyen, and Larnaudés, the men employed in keeping the sewers in order, perceived little or no change in the air of these places; but as soon as the chloride of lime was used they perceived so great an improvement, that, without having been informed that a change had been made, they came to inquire what had been used, and to request that it might also be employed in the other sewers.

We will finish this part of the subject by remarking, that, in order to maintain a constant purification in the above-mentioned privies, &c., it is necessary to use Ledoyen's fluid and the chloride of lime, twice in the twenty-four hours, and the liquid of Larnaudés at least three times in the same period.

B. EXPERIMENTS ON FECAL MATTERS.

The experiments we have made upon fecal matters, are quite as conclusive as those we have just reported upon sewers and privies.

We took two casks, in each of which we placed about 22 gallons of feces mingled with urine. Into one of them we introduced a pint and a half of the liquid of Larnaudés, and into the other two and a quarter pints of Ledoyden's fluid. After having mixed these as intimately as possible with the contents of the casks, we found that in both of them the odor of sulphureted hydrogen had completely disappeared; but a strong odor of ammonia still remained. It was difficult to decide by the sense of smell which of the two was most efficacious.

We accordingly resorted to the use of test papers imbued with acetate of lead, and reddened litmus. These were introduced into the casks without touching their contents. At the end of two hours the reddened litmus paper was restored to its original blue color, but the lead paper remained perfectly white.

We allowed the casks to remain undisturbed for nearly two months, to ascertain whether or not the sulphureted hydrogen would be reproduced. At the end of that time the test-papers were re-introduced, and we found that the lead paper remained white, but the litmus paper regained its blue color in the space of half an hour in both casks.

In order to judge of the action of these liquids upon the total extinction of ammonia, we added respectively to each of the casks the same quantities as before. After having been well shaken up, they were covered over with pieces of reddened litmus paper placed in the empty spaces. An hour afterwards the pieces of paper were restored to their primitive blue color. Finally we added to the casks double the quantity of liquid previously employed, and, notwithstanding this very large addition, the litmus paper was turned blue at the end of an hour; with only this difference, that the paper in the cask containing Ledoyen's fluid was a little less blue than the other. We here stopped these researches, as we were convinced that the complete neutralization of the ammonia by these proceedings, would be altogether too expensive.

The foregoing experiments did not appear to us sufficient for forming an opinion, as to the merits of these two fluids in decomposing the sulphureted hydrogen contained in fecal matters. We therefore took two other casks, and placed in them twenty-two gallons of feces and urine, in equal portions of eleven gallons each. Into one of them was thrown three quarters of a pound of Ledoyen's fluid, and into the other, half a pound of the liquid of Larnaudés. After mixing them

thoroughly, a notable diminution of the hydrosulphuric odor was perceptible, but the gas had not been absorbed to such an extent as to prevent the lead paper from being blackened, at the end of a few hours. The next day, similar quantities of the liquids were added to the casks; they were then shaken and covered over, lead papers having been previously placed in the empty spaces. After a few hours both papers were found blackened, but with this difference—very slight, indeed—that the paper from the cask containing the liquid of Larnaudés was a shade darker than the other.

These experiments sufficed to convince us that the liquid of Larnaudés was a little inferior in the intensity of its action upon sulphureted hydrogen to that of Ledoyen.

To complete these experiments, and compare the preceding with the other disinfectants in our hands, we repeated them with the chloride of lime and the perchloride of iron. We mixed one pound of chloride of lime with $3\frac{1}{2}$ pints of water, and added it to 22 gallons of fecal matters. We also added to another cask, containing the same quantity of similar matter, a liquid composed of half a pound of liquid perchloride of iron, half a pound of muriatic acid of commerce, and enough water to make the solution equal to two pints. On adding this to the fecal matter contained in the cask, so much effervescence was caused by the evolution of carbonic acid from the carbonates contained therein, that it was necessary to add it very gradually. When this had subsided, and the two casks were well shaken, so as to mix their contents, papers imbued with lead and reddened litmus were placed in them, and they were covered over. The papers were examined every hour. At the end of the first hour the litmus paper had hardly changed color. In three hours it was perceptibly blue; but it was necessary to wait seven hours to have the papers as blue as those which had only remained an hour in the casks in which Ledoyen's and Larnaudés' liquids had been tested.

As to the lead paper, it was still white at the end of two hours in the cask containing the acid perchloride of iron, but slightly darkened in that containing the chloride of lime.

It follows from these observations that, as regards the decomposition of sulphureted hydrogen, the chloride of lime is quite as efficacious as the liquids of Larnaudés and Ledoyen, whilst its cost is somewhat less than either of them. With respect to ammonia, it absorbs a much larger quantity, but, notwithstanding, a considerable amount of it remains unaffected. The acid perchloride of iron disinfected the same quantity of fecal matter about as well as any of the other articles employed, and, being much cheaper, might be employed where economy is an object. We must, however, observe that there are objections to it which it is proper to mention. First, it is a very acid compound, which cannot be safely confided to the hands of everybody; second, the acid may not only in the course of time injure the stones of the buildings in which it is used, but it may also destroy the texture of cloth or linen accidentally touched with it; and, finally, the abundant effervescence which it causes may, in some circumstances, render its use inapplicable.

For the purpose of ascertaining the quantities of chloride of lime, and acid perchloride of iron, necessary to cause the total disappearance of the ammoniacal odor, we added to the casks already submitted to their action the same quantities as before. At the end of twenty-four hours the reddened litmus was faintly tinged with blue in the cask containing the salt of iron. On the contrary, that containing the chloride of lime was turned completely blue, but it required the whole twenty-four hours to effect this result.

It is thus shown, that of all the means employed for the disinfection of fecal matters, the acid perchloride of iron, prepared in the manner above mentioned, is the most efficacious and economical in its action upon free ammonia, as well as upon sulphureted hydrogen and the hydrosulphate of ammonia.

C. EXPERIMENTS UPON THE AIR OF INFECTED WARDS.

The experiments which we are about to report were made in many of the wards of the Saltpetrière; but those made in the wards of St. Cecile and St. Rosalie, of the section of incurables, where are found, particularly in the last, patients affected with cancerous and cutaneous diseases, appeared to us the best tests for determining the comparative value of the liquids of Lédoyen and Larnaudés and the hyperchlorite of soda.

It is much more difficult than one would suppose, to be assured of the action of a non-volatile disinfectant upon the vitiated air of a ward. This is owing to a variety of causes. The organ of smell, by which only we can appreciate the difference of odor following the use of a disinfectant, is not always able to fulfill this office with exactness, either because it cannot perceive accurately the different degrees of odor before, during, and after a process of purification, or because it does not retain a distinct memory of the odor existing before the operation, when it afterwards attempts to ascertain its progress. On the other hand, the odors are so diverse, the miasms so abundant and complex in such a ward, that it is altogether impossible for a single disinfectant to cause all of them to disappear.

Some idea of the composition of the vitiated air of such a place as the ward of St. Rosalie may be formed, by recollecting that patients affected with cutaneous diseases, give out sulphureted hydrogen, carbureted hydrogen, phosphoreted hydrogen, hydrosulphate of ammonia, carbonate of ammonia, carbonic acid gas, nitrogen, &c., to which must be added the odors—whose nature is unknown—arising from the suppuration of ulcers, and also the peculiar odors from the stomach and intestines, from the breath, from the perspiration—composed of formic, acetic, butyric, and sudoric acids, and, above all, the indescribable odor emanating from the bodies and

clothes of the aged who people these establishments. We can then form a conception of the number of materials upon which a disinfectant must act in order to effect the restoration of the air of such a ward to a wholesome condition; and we are almost irresistibly impressed with the conviction, that no known disinfectant is sufficiently powerful to solve so difficult a problem.

MM. Ledoyon and Beaulavon maintain that their liquid is very efficacious in the purification of infected wards. They report a number of cases in which this liquid was perfectly successful. We must say, however, that we have not been as fortunate in our attempts as those patients have been, who have not hesitated to address to these gentlemen letters of the most favorable character, or who have given certificates attesting the good effects which they have obtained from its use.

A serious objection to this liquid as a disinfectant for wards is, in our opinion, the fixed nature of the disinfecting element, so that, instead of seeking out miasms in the atmosphere, in order to destroy or combine with them, the miasms are obliged to seek out, and come into contact with the liquid, before any favorable change can take place in the air of the ward.

M. Ledoyen accounts for this action "at a distance" by the principle of Berthollet, that when a certain space contains different gases, having no chemical action upon each other, each one expands uniformly throughout its whole extent in such a manner as to have a constant elastic force in every part of the space occupied, and that independently of the relative quantities of the gases forming the mixture. Hence it follows, says M. Ledoyen, that if in a chamber containing hydrosulphuric acid gas, there is a certain point at which this gas, in passing, will be destroyed by forming, as in this instance, a sulphuret of lead, the equilibrium of the gas disappears, and a movement immediately takes place to restore the uniformity of tension. Consequently, the liquid continu-

ing to act, all the hydrosulphuric acid will in a very short time come in contact with it, and be decomposed. The theory is correct, and perfectly accounts for the action of a fixed disinfectant, upon matters which are very volatile and diffusable, like hydrosulphuric acid gas. But we are far from believing that it requires so short a time as M. Ledoyen asserts. Indeed, he has not himself relied upon this alleged promptitude of action; he having endeavored to increase as much as possible the absorbing surface of his disinfectant. Accordingly he conceived the excellent idea of multiplying the surfaces of action of his liquid by fabricating certain cloths, to which he has given the name of hygrometric sanitary cloths. These, hung up in infected wards, are, of course, more efficacious than the simple liquid. They are rendered hygrometric by means of a certain proportion of nitrate of lime, which, being very deliquescent, preserves the cloths constantly in a state of humidity, very favorable to the chemical combination of sulphureted hydrogen with the salt of lead, which forms the basis of his liquid.

Nevertheless, in spite of these precautions, which in some cases may be of service, and in spite of the theory to which we have referred, the use of these cloths did not furnish results as satisfactory as could have been wished.

In the wards of St. Cecile and St. Rosalie, of the section of incurables, M.M. Ledoyen and Beaulavon hung up one of their disinfecting sanitary cloths at the foot of every bed. After their application, it was with difficulty that the sense of smell could detect the least improvement, notwithstanding the greatest care was taken to discover any change that might have taken place. In vain, for a whole month, we entered the wards every morning before the windows were opened; in vain we alternately removed and replaced the cloths: no change was perceptible to our olfactories.

The reason of this is, beyond a doubt, that the liquid acts

only upon a small number of unpleasant odors ; and also because its action upon miasms, or rather the phenomenon of the absorption of gas by a fixed agent, is not as instantaneous as M. Ledoyen supposes. Here is an experiment in physics which shows the manner in which Ledoyen's fluid acts, we will not say upon miasms, but upon sulphureted hydrogen, supposing for a moment that the oxygen of the air has no share in its decomposition. If we take a bell-glass, the contained air of which has been rendered humid by a layer of water at the bottom, to such a degree that a hair hygrometer indicates 100° of humidity, and replace the water by a substance having a strong affinity for this fluid, such as dry chloride of calcium or concentrated sulphuric acid, the index of the instrument will, after a time, mark 0°. Consequently the fixed body will have absorbed the whole of the aqueous vapor, a phenomenon very analogous to that which ought to take place between the prepared cloths and the vitiated air of the above-mentioned wards. But to arrive at 0°—that is to say, to the point at which the index of the hygrometer stops at the point of maximum dryness—requires not less than fifteen or twenty days. If, then, this length of time is required for a body having a great avidity for moisture, to absorb all that is contained in the limited space of a few cubic inches, the same length of time, at least, must be necessary for these cloths to absorb all the sulphureted hydrogen of an apartment containing many hundreds of cubic feet, admitting even that there is no source present from which it is continually evolved.

The motion of the air in the wards does, no doubt, favor the contact of the miasms with the cloths, but never to such an extent as to produce the instantaneousness of action described M. Ledoyen. Besides, experience proves this.

We admit, then, that the cloths of MM. Ledoyen and Beau-lavon have disinfecting properties to a certain extent, but we

are far from thinking that they have all the efficacy, and especially the quickness of action, which is claimed for them. A little detail is necessary to explain clearly our opinion of these cloths. In a multitude of cases it is sulphureted hydrogen which renders the air offensive, but in these cases we must take into account the action of the oxygen of the air upon this gas. We know, in fact, that it is readily decomposed by oxygen, which unites with its hydrogen to form water, and liberates its sulphur, which is comparatively inodorous. Thus, in some circumstances, the improvement which took place may have been attributed to the action of these cloths, when it was really caused by the oxygen of the air. Again, the action of these cloths is necessarily limited by the quantity of the nitrate of lead they contain, the metal of which can only absorb a determinate quantity of sulphur.

For example, we know that each cloth, having a length of about two yards, and a breadth of something less than one, contains nearly an ounce and a half of pure nitrate of lead; consequently nothing is easier than to calculate the amount of sulphureted hydrogen which it can decompose. It is only necessary to state the following formula :

$$2000.80^* : 213.16^\dagger :: 720^\ddagger : x$$

$$\text{Now, } \frac{213.16 \times 720}{2000.80} = 76.70, \text{ hence } x = 76.70.$$

Thus 720 grains of nitrate of lead, in being transformed into a sulphuret, absorb a weight of sulphureted hydrogen equal to 76.70 grains; and this quantity once absorbed, the cloth becomes perfectly inert. It must also be remarked that this action, in itself feeble on account of the fixity of the salt, decreases in proportion as it approaches the point of saturation. We can now see how it is that these cloths are without

* Equivalent of nitrate of lead.

† Equivalent of hydrosulphuric acid.

‡ Number of grains of nitrate of lead in the cloth.

appreciable action, when employed in wards in which a constant source of disagreeable odors exists. Farther on we will point out circumstances in which their efficacy is much more evident.

Notwithstanding all this, we do not doubt the good faith of the inventors. We are persuaded that they have allowed themselves to be deceived by the moral influence which the mere presence of these cloths has exercised on the minds of some persons.

Thus, after having satisfied ourselves that no change had been made in the air of the wards by the use of these cloths, we interrogated a number of the sick. Some of them said that they perceived a great difference, whilst others detected none whatever. The presence of the cloths was therefore sufficient to make some persons believe that a perceptible improvement had followed their use.

It was quite otherwise with the next means of disinfection, which we employed in the same wards.

This consisted simply in placing at the foot of each bed, a small earthen pot containing about four ounces of hypochlorite of soda. Although we cannot say that the purification was complete, it was easy for us, as well as for the sick and their attendants, to perceive that the air was rendered infinitely more respirable than it had been by the use of the above-mentioned cloths. We continued the use of the hypochlorite of soda for fifteen days, and the result was always the same; that is to say, the sense of smell easily recognized the favorable change which had taken place in the air of the wards.

At the end of that time we allowed the wards to remain in their ordinary state for some days. We then made an attempt at purification by means of the liquid of M. Larnaudés. But we may say at once that it was impossible to detect the least improvement from its use. Further, it is difficult to conceive how such improvement could be possible; for Larnau-

des has not, like Ledoyen and Beaulavon, provided a means of offering a large surface of action for his fluid. We could therefore only place at the foot of each bed a small pot containing the antimephitic liquid; and as this agent is entirely fixed, it is obnoxious to the same objection we have made to Ledoyen's fluid—slowness of action.

In these experiments, as in those upon fecal matters, we made use of two re-agents, lead and litmus. The lead paper was prepared with a mixture of acetate of lead and acetate of potassa, for the purpose of rendering it more hygrometric, and thus favoring the chemical action of the gas. These papers were placed in different parts of the wards before the commencement of the experiments. At the end of fifteen days the lead paper was slightly tinged, brownish yellow. The reddened litmus paper was obviously changed to blue. After the use of the cloths of Ledoyen and Beaulavon for the same length of time, the lead paper was scarcely less discolored, and the litmus paper was turned as blue as before. The liquid of Larnaudés did not at all prevent the discoloration of the lead paper, or the change of the litmus from red to blue; on the contrary, when the chloride of soda was used, no appreciable change of color could be noticed in the papers, at the end of fifteen days.

It follows from these facts, that the chloride of soda was infinitely more efficacious in the purification of these wards, than the liquids of Ledoyen and Larnaudés. It is easy to account for this. Chlorine has the property, not only of decomposing sulphureted hydrogen, phosphureted hydrogen, ammonia, and volatile hydrogenized organic matters, by uniting with their hydrogen, but the hydrochloric acid which results from this combination has also the power of neutralizing a certain quantity of ammonia. Besides, chlorine being volatile, soon pervades the whole atmosphere of an apartment, and thus seeks out the mephitic gases it is intended to decompose. This ex-

plains the great difference we have observed between the action of the hypochlorite of soda and the two other disinfectants, above all, its greater promptitude.

The hypochlorite of soda possesses another advantage; the hypochlorous acid is gradually set free, by the combination of the carbonic acid of the air with the soda. The air is thus deprived of a certain proportion of its carbonic acid, and the hypochlorous acid, not being able to exist in a free state without decomposition, is resolved into chlorine and oxygen. The oxygen unites with a portion of the sodium of the chloride of sodium, which always exists in the hypochlorite, and a new quantity of chlorine is set free. Thus we have two sources of chlorine; 1st, that derived from the hypochlorous acid; 2d, that which was in combination with the sodium. In this way every thing turns to the benefit of the respiration.

Chlorine, it is true, should not be in excess in the atmosphere, in order to avoid irritation of the organs of respiration; but our experiments in the wards of St. Cecile and St. Rosalie prove that this can be easily done. Persons entering the wards from the fresh air did not even suspect the presence of chlorine, and the sick, instead of experiencing any embarrassment of respiration, according to their own expression, found the air "less thick."

We must add, however, that Ledoyen's fluid, employed with intelligence, may be of great service in sick wards. It has been used for a long time at the Bicêtre in the St. Victor and St. Praosper wards; and all the attendants, including the director and surgeon, agree in regarding it as one of the best disinfecting agents. Great care, indeed, is taken to keep the liquid constantly in all the close-stools, and the chamber utensils are always washed with the diluted liquid. The inconvenience of having all these vessels incrustated with a dark layer of sulphuret of lead is amply compensated by the advantage of having the air of the wards free from odor; and consequently

in a good hygienic condition. We visited these wards twice, and each time we perceived the advantage of this system.

These wards, however, are far from resembling those of the Salpêtrière in which we made our experiments. At the Bicêtre, the wards, relatively to the number of sick, are spacious; they have been lately repaired and can be easily ventilated. All the utensils used by the sick are emptied as soon as used, and consequently the offensive odors which they give out are only transient. In these respects there can be no comparison with the wards of the Salpêtrière to which we refer. They are of very ancient construction, afford less space relatively to the number of sick, and are less easily ventilated. Moreover, the greater number of the patients being either cancerous, or affected with cutaneous diseases, there is an incessant production of bad smells which cannot be easily dissipated; and some of these are certainly unaffected by the cloths of Ledoyen and Beaulavon.

Lastly, the antimephitic liquid of Larnaudés was also used at the Bicêtre. The director, who took the trouble of attending personally at these processes, in order to judge for himself of their relative value, ascertained that it was inferior to the fluid of Ledoyen. We will see, farther on, that it is possible to explain this difference, although, *a priori*, it would seem difficult. Nevertheless, this does not hinder the liquid of Larnaudés from being a very good disinfectant, as is attested by certificates signed with honorable names.

D.

EXPERIMENTS UPON ANIMAL MATTERS IN A STATE OF PUTREFACTION.

The conditions in which the liquid of Ledoyen and his sanitary cloths appeared to us to act with undoubted efficacy, were those which consisted in their application to sources of

infection perfectly known and circumscribed; for then they could be restricted, so to speak, in an inclosure having its walls thoroughly imbued with the disinfectant. Under these circumstances, the mephitic odors, in passing out of the inclosure, being obliged to come in contact with the disinfectant, must be decomposed, if they are of such a nature as to be acted upon by the nitrate of lead.

Thus dead bodies taken to the Morgue in an advanced stage of decomposition, have rapidly lost their bad odor by being washed freely with Ledoyen's fluid. The same result has been attained by enveloping the bodies in the sanitary cloths, or simply in cloths impregnated with the fluid. Yet, if in a majority of cases this liquid can be employed without inconvenience in the preservation of dead bodies, there are some in which its use is rigorously interdicted; for example, cases in which a toxicological investigation is required for judicial purposes.

One of the best applications of Ledoyen's fluid consists in its employment as a dressing to wounds or ulcers of an offensive character. In many cases all unpleasant odor has been confined to the dressings by covering them with a cloth wet with this liquid.

In the same manner, foul and offensive dressings, &c., in a state of putrefaction, shut up in chests or boxes, and covered with the sanitary cloths of Ledoyen and Beaulavon, have been prevented from diffusing any disagreeable smells.

It can now be understood, after what has been said, that if we are situated near a source of offensive emanations, from which there is only a single or a limited number of openings, it will be sufficient to place one or more of these cloths in such a position that the gas in escaping is obliged to pass through them, for us to have the almost certain assurance that no more unpleasant odors need be feared.

In such circumstances these cloths are very useful. They

are free from the inconveniences which the use of the hypochlorites might present, and the fixed nature of the disinfecting salt, which is an objection to its employment for the purification of an inhabited apartment, becomes an advantage, because, being used in the open air, there is no reason to fear that the purity of the air which is respired will be affected. The use of the hypochlorites would, perhaps, in such circumstances, be attended with the inconvenience of furnishing more chlorine than might be requisite, which, by its volatility and irritating properties, might produce some embarrassment in the play of the respiratory organs. MM. Ledoyen and Beaulavon possess many certificates attesting the efficacy of their sanitary cloths in circumstances more or less analogous to those which we have mentioned.

As to the liquid of Larnaudés, it possesses, we think, in these respects, properties nearly the same as Ledoyen's. But, as M. Larnaudés did not use his liquid in the form of hypometric cloths, we have not been able to test it in exactly the same way, and cannot, therefore speak with certainty.

M. Ledoyen is of opinion that his fluid is very useful as a dressing in gangrene, cancer, &c. He says that it ought to be used more or less diluted with water, according to the degree of irritability existing, and that if at the first dressing the pus is of a bad quality, it should be employed at its ordinary strength, and that for the subsequent dressings it ought to be gradually diluted with one, two, three, four, five, and six parts of water. It is observed that the first dressings are usually blackened by the formation of sulphuret of lead, but this tint gradually disappears in proportion as the process of healing progresses. Some respectable physicians of hospitals have found it useful in such cases, but we must say that it was not always the experience of M. Cazalis, at the Salpêtrière. This physician is of opinion that there are cases in which its use might be dangerous on account of the metallic salt which it

contains. Besides, we obtain equally good results with the hypochlorite of soda, which has the advantage of not discoloring the wounds or ulcers to which it is applied.

E.

EXPERIMENTS UPON ANIMAL MATTERS EASILY PUTRESCIBLE, BUT NOT IN A STATE OF PUTREFACTION.

In view of the greater or less permanence of the purifications made with the agents above named, and, particularly, as we were influenced by the idea of M. Ledoyen, that the nitrate of lead alone possesses the curious property of preventing the putrid fermentation, it became our duty to ascertain if this salt really possesses this property to a greater degree than the other disinfectants.

Although it has been known for a long time that various substances have the power of hindering or retarding the putrefaction of organic matters, we determined to submit to comparative trials, the principal disinfecting agents at our disposal, in order to ascertain their relative efficacy in this respect.

With this view we selected milk and urine, substances that putrefy with remarkable facility.

On September 26th, we took six bottles, in each of which we placed 250 grammes of pure fresh milk. In one we added 1.505 gr. of nitrate of lead; to the second, 0.807 of sulphate of iron; to the third, 0.895 of sulphate of zinc; to the fourth, 1.558 of sulphate of copper, quantities that represent the half of the chemical equivalents of the metals forming the bases of the salts employed. To the other two bottles we added dry chloride of lime (hypochlorite), and to the other, hypochlorite of soda. But, as it was difficult, considering the variable composition of these bodies, to know the exact quantity necessary to represent an equivalent of chlorine, we thought it sufficient for our present purpose to place in them a quantity representing an equal cost, and for that reason we added to

one of the bottles 0.5 grammes (about 8 grains) of the chloride of lime, and to the other 5 grammes (about 78 grains) of chloride of soda.

These substances, well mixed with milk, were left undisturbed for four months. At the end of that time, we observed that the milk was curdled, and only had the smell of sour milk that had been kept two or three days in ordinary weather; but no odor of putridity could be detected. It had, nevertheless, disengaged a little gas in the course of the experiment, which we had not time to analyze, but it appeared to us to be more or less abundant, according to the salt employed. Every time we opened the flasks to ascertain the progress of the experiment, those which contained the nitrate of lead, the sulphate of iron, and the sulphate of copper, gave only traces of gas, but those holding the sulphate of zinc and the hypochlorites of lime and soda gave out much more, which was easily known by the explosive manner in which the corks flew out when the bottles were opened. Indeed, the hypochlorite of soda furnished such a quantity, that a portion of the contents of the bottle was thrown out by the effervescence. It is proper to state that the bottles were left unopened for ten days towards the end of the experiment.

It might be supposed that the lactic acid, which is formed in milk, caused the disengagement of carbonic acid, by acting upon the carbonates of lime and soda always mingled, more or less, with the hypochlorites. But this explanation could not apply to the same phenomenon in the bottle containing the sulphate of zinc. This salt, perfectly pure and crystallized, could not give rise to a similar reaction.

Although these experiments, in view of the chemical reactions that take place between milk and these different salts, leave much to be desired, they show that their action is nearly the same in rendering it imputrescible; yet, nevertheless, a difference is observable as to the formation of gas.

This difference is much more marked in similar experiments made with urine instead of milk. Six bottles, each containing 850 grammes of fresh human urine, were furnished with the respective quantities of the same salts as in the previous experiments, and left undisturbed for about the same length of time, care being taken to open them every day to observe the progress of the experiment.

For fifteen days there was no appreciable bad smell, and we left the bottles for some days without opening them. We then remarked a slight difference of odor, which increased so, that at the end of three months from the beginning of the experiment, we noticed the following results. Unfortunately, these are difficult to describe, for words cannot clearly express the differences of odor we recognized, although they were clear enough to the sense of smell.

With chloride of lime,	precipitate grayish white; odor of urine nearly normal, slightly ammoniacal.
" " soda,	precipitate none, or a little cloudy; odor aromatic, rather agreeable, recalling that of muriatic acid.
" sulphate of copper,	precipitate chestnut-brown; odor approaching that of normal urine, but slightly disagreeable.
" " iron,	precipitate gray, slightly greenish; odor disagreeable,
" " zinc,	precipitate gray, slightly reddish; odor disagreeable stale, disgusting.
" nitrate of lead,	precipitate white; odor very similar to the preceding, but stronger

These different odors appearing to us to be ammoniacal, we endeavored to discover the relative quantities of ammonia existing in them. With this view, we attached pieces of strongly reddened litmus paper to the corks, and, having replaced these in the bottles, allowed them to remain for twenty-four hours. At the end of that time, we perceived that the test papers had acquired different tints, which we will arrange in order from red to blue:

Sulphate of copper,	red, almost normal.
Chloride of soda,	scarcely perceptible violet shade.

Sulphate of zinc,	violet shade.
Nitrate of lead,	decided violet.
Sulphate of iron,	deeper violet.
Chloride of lime,	very deep violet.

If it were desirable to express these different shades of color more definitely, it might be done by dividing the interval between the two extremes into 100 parts, making the normal red 100, and the blue 0; thus:

Sulphate of copper	— 90 to 100
Chloride of soda	— 85 " 90
Sulphate of zinc	— 70 " 80
Nitrate of lead	— 40 " 50
Sulphate of iron	— 20 " 25
Chloride of lime	— 5 " 10

These numbers, of course, are only approximate, but they show more distinctly than mere description, the different shades of color.

Let us add that the specimen treated by the chloride of lime, although preserving almost perfectly its natural odor, was the only one that permitted the formation of microscopic vegetation, apparently belonging to the class of fungi, and having the appearance of white mould. This may be easily conceived when we remark, that these vegetables are particularly developed in situations where decomposition is going on, and where there is, at the same time, considerable formation of ammonia.*

It evidently follows from the foregoing experiments, that, if all the above-mentioned salts prevent the putrefaction of milk,

* Since the presentation of this report, the specimens of urine treated with chloride of soda, sulphate of zinc, and sulphate of iron, have exhibited similar vegetations, but at very different intervals of time. They appeared about a month after the commencement of the experiment, in the bottle containing the chloride of lime; in two and a half months in that containing chloride of soda; three months in that holding sulphate of iron; and within the last few days, after three and a half months, in that containing sulphate of zinc. There is nothing as yet to indicate the occurrence of a similar phenomenon in the flasks holding sulphate of copper and nitrate of lead.

the sulphate of iron, the sulphate of zinc, and the nitrate of lead, hinder the putrefaction of urine only for a short time—more particularly the two last named. Now, it must be remembered that the sulphate of zinc is the salt that forms the basis of the antimephitic liquid of Larnaudés, and the nitrate of lead that which constitutes the disinfecting liquid of M. Ledoyen. What, then, is the cause of the differences we observed between the action of the liquids of Krammer, Ledoyen, and Larnaudés, in our experiments upon the disinfection of sewers and privies? We shall endeavor to account for them in the general reflections which follow.

We will first state, however, that we also made comparative trials of the liquids of Ledoyen and Larnaudés, upon the flesh of animals, and satisfied ourselves that anatomical specimens, preserved for at least six months, had not contracted the least bad smell in either of them.

GENERAL REFLECTIONS.

We have said in another place, that all the salts having a metallic base capable of forming an insoluble sulphuret, may be indiscriminately used as disinfectants; for their oxyds not only seize upon sulphureted hydrogen to form water and a sulphuret, but they also decompose hydrosulphate of ammonia, which is always found wherever sulphureted hydrogen and ammonia co-exist, as in cess-pools, privies, &c. The oxyd acts, as we have said, upon sulphureted hydrogen, and at the same time the acid of the salt unites with the ammonia, to form a less volatile compound. This affords an explanation of the total disappearance of the hydrosulphuric odor, when the disinfectant is in sufficient quantity, and when circumstances favor its effectual action.

As, in general, it is the hydrosulphuric acid or the hydrosulphate of ammonia that it is necessary to remove, or rather to decompose, the problem is reduced merely to one of

economy. Now, if we reflect that an equivalent of hydrosulphuric acid, or hydrosulphate of ammonia, always requires for its decomposition a quantity of a salt containing an equivalent of metal, it is not difficult to calculate, approximately, which salt can be most advantageously used in an economical point of view. But, to render this clear, we must enter into some chemical details.

The metals which serve as the bases of the salts employed as disinfectants are most usually iron, manganese, zinc, copper, and lead. Now, equal weights of these metals do not absorb an equal quantity of sulphur, and, consequently, do not decompose the same quantity of sulphuretted hydrogen or hydrosulphate of ammonia. This may be otherwise expressed by saying that the chemical equivalent of one metal is higher or lower than another; for example:

The equivalent of lead	— 1233.50
“ “ copper	— 791.39
“ “ zinc	— 403.00
“ “ manganese. . . .	— 345.89
“ “ iron	— 339.21

Which means to say, that the equivalent of sulphur being — 201.10, 1233.50 lbs. of lead will be required to absorb 201.10 lbs. of sulphur, but only 339.21 lbs. of iron will be necessary to form, with the same amount of sulphur, a corresponding sulphuret. The same quantity of sulphur requires 791.39 lbs. of copper, 403 lbs. of zinc, and 345.89 lbs. of manganese. Hence it appears that, at equal prices, lead would be the most expensive, and iron the cheapest. But copper, lead, and zinc are much dearer than iron, and, consequently, iron has the advantage in every respect.

The same reasoning may be applied to the acids in combination with these metallic oxyds. The acids which salify the metals employed as disinfectants are usually the nitric, sulphuric, and muriatic. Now,

The chemical equivalent of nitric acid is . . .	— 677.30
“ “ sulphuric acid is . . .	— 501.10
“ “ muriatic acid is . . .	— 214.25

Which means, expressing these equivalents by pounds, that whilst 677.300 lbs. of nitric acid, or 501.100 lbs. of sulphuric acid, are required to neutralize a quantity of oxyd of iron containing 100 lbs. of oxygen, only 452.120 lbs. of hydrochloric are required for the same quantity of oxyd of iron. It follows, of course, that, at equal prices, the hydrochloric acid would be more economical than sulphuric acid, and much more so than nitric acid. But nitric acid is more expensive than an equal weight of either of the other two acids; consequently, the most economical disinfectant is constituted by the union of iron with sulphuric or muriatic acid.

Moreover, as 1233.500 lbs. of lead, in the ordinary state of things, only absorbs 100 lbs. of oxygen to form the oxyd of lead, the oxyd can only decompose a quantity of hydrosulphuric acid, or hydrosulphate of ammonia, capable of yielding 201.160 lbs. of sulphur to form a sulphuret corresponding in composition to itself. Iron, on the contrary, passes easily into the state of peroxyd, and 339.210 lbs. of the metal can absorb 150 lbs. of oxygen. Consequently, this quantity of metal, in the state of a salt, would require a quantity of sulphureted hydrogen, or hydrosulphate of ammonia, capable of affording 301.740 lbs. of sulphur, in order to form a sulphuret corresponding to the sesquioxycd of iron. But it is not altogether thus, for it is seldom that all the iron of a salt is in the state of peroxyd, and ordinarily we only obtain by its decomposition a sulphuret corresponding in composition to the magnetic oxyd of iron, formed of two equivalents of the protosulphuret and one of the bisulphuret. It is none the less true, however, that three equivalents of the persalt of iron decompose four equivalents of sulphureted hydrogen and hydrosulphate of ammonia, whilst three equivalents of a salt of lead can never decompose more than three equivalents of the same bodies. Admitting equal weights and costs, there

would still be, in reality, an economy of one fourth in the use of the persalt of iron in preference to a salt of lead.

From the preceding reasoning, we perceive that there are three sources of economy in favor of the perchloride of iron, to wit: 1st, economy in metal; 2d, in acid; and 3d, in the proportional quantity of sulphureted gas which it decomposes.

An important point of the subject, to which we would call the attention of those interested, is the manner in which hydrosulphuric acid is produced. The formation of this gas in fecal matters may have two different origins, viz.: 1st. Combination of hydrogen—formed, during the process of digestion from alimentary matter—in a nascent state, with the sulphur regarded as a constituent of albuminous substances. 2d. Decomposition of the soluble sulphates found in the solid and liquid aliments. In fact, under the influence of a certain degree of heat, and in presence of organic matter, the soluble alkaline sulphates are readily transformed into sulphurets, the odor of which is so characteristic. Sulphates, therefore, should never enter into the composition of a disinfectant; for the sulphuric acid, in abandoning its oxyd, will enter into combination with the alkaline bases contained in fecal matter; and, little by little, the new sulphate, under the influence of organic matters, will be converted into an alkaline sulphuret, which will continue to give out the hydrosulphuric odor. It is because inventors have neglected to recognize this principle, that their proceedings, at first successful in disinfecting fecal matters, have frequently failed in securing that permanence of action which is so desirable.

On this account, obviously, the method of Ledoyen presents a marked advantage over the others. Indeed, the salt that he employs is not only not a sulphate, but it is, also, a salt of lead which decomposes the alkaline sulphates, forming the insoluble sulphate of lead, on which organic matter has little or no effect. Thus, whilst the greater number of disin-

fectants only decompose the hydrosulphuric acid already formed in fecal matters, without destroying the soluble alkaline sulphates, which, ultimately decomposing, continue to emit a bad odor, the nitrate of lead, on the contrary, reacts at the same time on the sulphureted hydrogen already formed, and upon the sulphates. In destroying all the causes that produce sulphuretted hydrogen, the liquid of Ledoyen has necessarily a permanence of action which other disinfectants, not acting in an analogous manner, do not possess.

CONCLUSIONS.

In order to condense, as much as possible, the principal facts contained in this report, we recapitulate as follows :

1st. In the disinfection of sewers and privies, we only experimented with the liquids of Krammer, Ledoyen, and Larnaudés, and with the chloride of lime. This last body is incontestibly the best; after it comes the liquid of Ledoyen, equal, as regards permanence of action, to the chloride of lime, and double in this respect to the liquid of Larnaudés. This last, notwithstanding, acts very well. All of them, however, with the exception of chloride of lime, act very feebly in removing ammonia.

2d. By our experiments directly upon fecal matters, with the various agents at our disposal, we established that, at equal cost, they acted efficaciously in the following order, commencing with the best :

Acid perchloride of iron.
Hypochlorite of lime.
Ledoyen's liquid.
Larnaudés' liquid.

We have shown the inconveniences which attend the use of the acid perchloride of iron and the chloride of lime. They have, however, the advantage, in common with Ledoyen's fluid, of not introducing sulphates into fecal matters. On

account of the inconveniences referred to, the liquid of Ledoyen will be preferred in many cases, though it is more expensive, and has little effect upon the ammonia of privies.

3d. Chlorine, in the form of hypochlorite of soda, succeeded best in removing unpleasant odors from the air of wards. Ledoyen's fluid, even employed in the form of his sanitary cloths, did not succeed in purifying the air of the wards of St. Cecile and St. Rosalie. Although, theoretically, it should have produced some effect, none whatever was perceptible. The real cause of this difference is, that chlorine is volatile, and being diffused in the air, decomposes not only hydrosulphuric acid, but also beyond a doubt, other odorous organic substances. Then, again, the nitrate of lead not being volatile, it is necessary that all the contaminated air should come into contact with it, in order to lose its sulphureted hydrogen alone; for, if there are other odors present, we cannot conceive how it can possibly affect them.

4th. If the object is to act on a source of deleterious emanations of small extent, the offensive odor of which is, above all, due to sulphureted hydrogen, the sanitary cloths of Ledoyen and Beaulavon are certainly the best means to adopt. The air in escaping must pass through the cloths, and lose its sulphur in its contact with the nitrate of lead. The non-volatility of the salt is here a precious advantage, because we are sure that the air is not charged with it. Whereas, with the use of hypochlorite of soda, we are exposed to respire a certain quantity of chlorine, which, not being neutralized in the atmosphere, might prove injurious to the respiratory organs.

5th. The greater or less permanence of these agents, induced us to try their bases upon fresh animal matters, for the purpose of ascertaining, comparatively, their power of preventing or retarding decomposition. The general result was, that

all of them prevented the putrefaction of milk for at least four months; that the liquids of Ledoyen and Larnaudés prevented the putrefaction of muscular flesh for at least six months; that urine was preserved longer in its normal state by sulphate of copper, chloride of lime, and chloride of soda, than by the sulphates of iron and zinc, and the nitrate of lead; and that these last salts particularly did not hinder urine from having a very unpleasant odor at the end of two months.

6th. Finally, in the general reflections, we discussed the question of economy, which, in short, is in all respects favorable to the chloride of iron. We demonstrated that the sulphates are, of all the salts, the least adapted to produce a permanently good effect, the alkaline sulphates formed during their action being liable, in presence of organic matter, to enter into decomposition, and thus reproduce the evolution of sulphureted hydrogen. Ledoyen's fluid has the advantage of not introducing sulphates, and also of decomposing any sulphates that may be present, by forming an insoluble sulphate of lead, upon which organic matters have no effect.

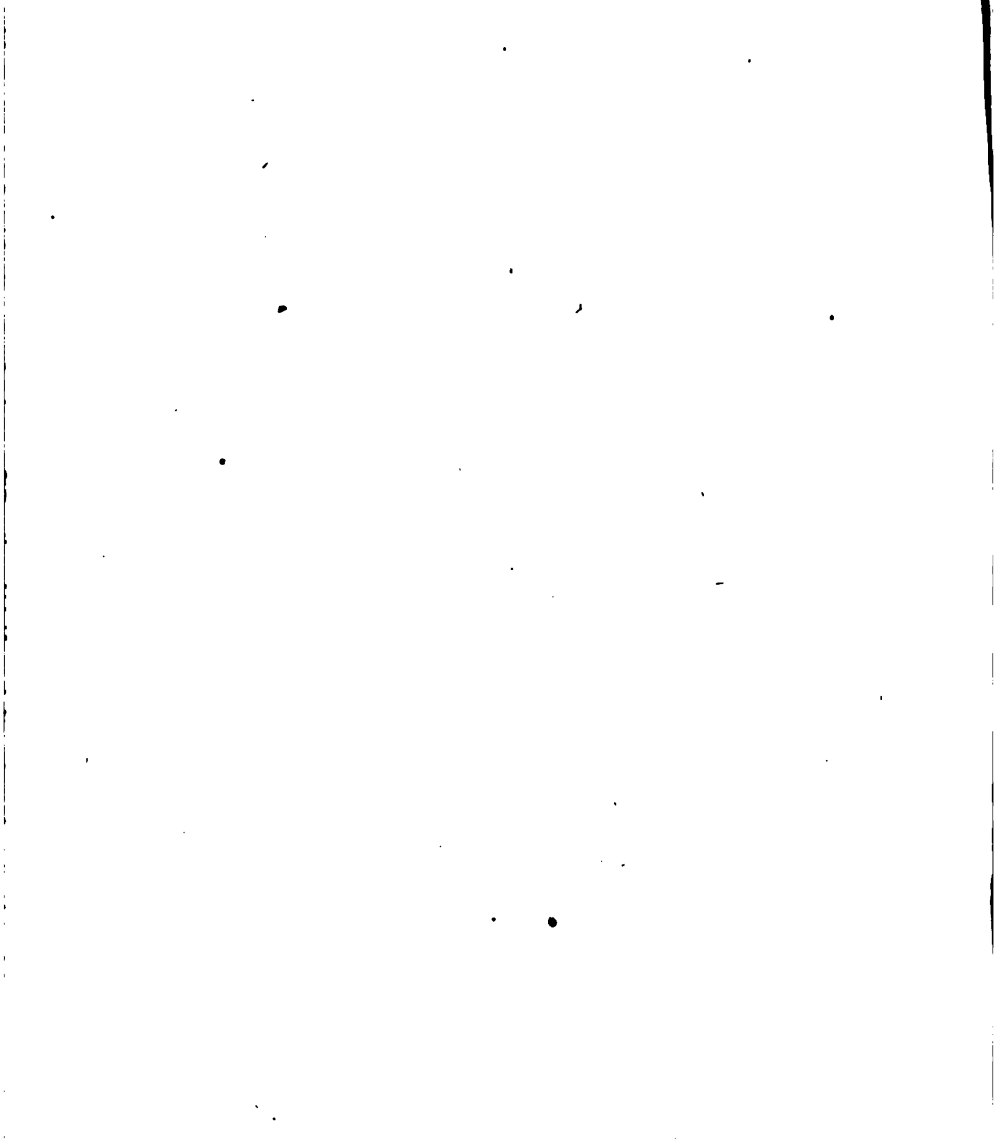
Appendix C.

R E P O R T

UPON

SEWERAGE, WATER SUPPLY, AND OFFAL.

By JOHN H. GRISCOM, M.D., of New York.



REPORT.

IN his artificial condition of civilization, there are two classes of circumstances which affect the health of man: 1st, Those which are found exclusively *within* his domicile; and 2d, Those which are more particularly operative *without* his dwelling. To the former class belong the various impurities of the atmosphere derived from respiration, combustion, and exuberant moisture, the quality of food, the clothing, and personal cleanliness. Included in the latter, or extra-domiciliary causes of disease, are terrestrial emanations, meteoric changes, and the influence of those matters, which having been cast out from the dwelling, are suffered to undergo decomposition in its vicinity.

To me has been assigned the duty of reporting upon "the importance of an ample supply of water, an adequate sewerage, and the proper disposal of offal."

The first of these objects of inquiry, water, belongs to both classes of circumstances, *i. e.* the internal and external domiciliary. Used as a beverage, for cooking, for bathing, for washing, and cleansing generally, it pertains to the internal affairs of the household; as a means of cooling the atmosphere, of absorbing free gases, of cleansing the ways, and of removing filth, its applications are chiefly external, and in this direction, though more extensive as regards area, they are less important than in their indoor relations.

Of the vast importance of an ample supply of water for family use, an impression may perhaps be best formed by imagining the horrors of a drought, in contrast with the comforts of an abundance of this element furnished unstintedly; and

the measure of the comfort and health of a people, or even of a single household, may be judged by the approach to one or the other of these extremes, of the water afforded to, and used by them. There is nothing extravagant in the conjecture, that in many of the very crowded portions of cities, where dwellings rise to the height of five or six stories, up to which it is impossible, by hand labor, to carry an ample supply of water, that there, suffering and sickness from the deficiency, are marked and decided, while nearer the ground, the inhabitants, being better able to observe rules of cleanliness, and to use it more freely in every way, are on this account less prone to evils of many kinds.

Water should be second only to air in abundance and accessibility; as the poorest has no excuse for self-privation of air, nature pressing it upon him with the force of fifteen pounds to the square inch, and he having only to expand his chest to receive it, so should water be accessible to every one, the poorest more especially, simply by the opening of a valve, that there might be no excuse for its neglect. Stephen Girard and John Jacob Astor could have made no better disposition of their wealth, than to have given the waters of the Schuylkill and the Croton to their fellow-citizens without price.

Passing to the subject of sewerage, we have to observe that terrene exhalations in rural localities are a well-known cause of various diseases, which need not be here enumerated. From this cause every city should and can be, made almost wholly free. However vicious may be the soil upon which a city stands, a thorough system of paving and sewerage will prevent the natural exhalations, and obviate the diseases which will otherwise flow from them. But however well paved and sewered a city may be, whereby its natural exhalations are obviated, the formation of *artificial* marshes above the stones of the pavement, and beyond the reach of the

sewers, by the accumulation of the offal of men and animals, is equally bad, if not worse. The marsh miasm of new countries which produces intermittent, remittent, and bilious fevers, the scourges of uncultivated regions, is the result of *vegetable* decomposition only; but if to this there be added a large proportion of animal matter, and the exhalations of the combined decomposition are suffered to invade our dwellings and surround us continually, the intensity of the malarious poison is redoubled, and in addition to the diseases just mentioned, we have Diarrhoea, Dysentery, Cholera, Typhus Fever, and a general depression of the vital powers, which renders every other disorder more dangerous. Of such a character is the miasm of a city of uncleaned and unwashed streets, where the *débris* of the kitchens and manufactories are allowed to accumulate on the surface, exposed to the decomposing influences of the air, the sun, and the rains, and where the fecal emanations of the inhabitants are *preserved* in sinks and cess-pools.

If even the tidal waters of such a magnificent sewer as the river Thames, are insufficient to relieve the city of London of the pernicious effects of its vast amount of animal and vegetable *débris* and exhalation, how clean soever its surface may be kept, how much more offensive and deleterious must be the compound animal and vegetable malaria from these same materials, stagnant upon the surface. They form artificial marshes more dangerous than the Pontine.

"The sewerage of large towns and cities consists of refuse animal matters, of the excrementitial discharges of the inhabitants and myriads of the lower animals, of the blood and animal fluids from slaughter-houses, knacker's yards, and tan-pits, of the foul and contaminated waters from gas-works, factories, and other establishments, and of refuse vegetable matters in a state of decomposition from public markets and other places."* The combined amount of these matters is

* Hygiene, by Dr. Pickford.

estimated at seven cubic feet (about fifty gallons) per diem, for each individual, which for the city of New York, with a population of 700,000, rises to the daily average of 35,000,000 gallons, and annually to the astounding quantity of twelve billions seven hundred and seventy-five millions of gallons (12,775,000,000).

To descant upon the necessity of the immediate and thorough removal of this prodigious mass of waste animal, vegetable, mineral, and gaseous matter, which, were it possible to concentrate it daily, in separate deposits, would require for each day, a reservoir fifty per cent. larger than the Croton distributing reservoir on Murray Hill, New York City; to descant upon the absolute necessity of an immediate removal of these immense masses of poisonous matter far away from the precincts of human lungs; to discuss the fearful results which would follow their retention—would seem to be a work of supererogation; and yet we find even intelligent citizens and legislators almost everywhere, doubting, hesitating, and procrastinating.

To all such we commend earnestly, and in the pure spirit of patriotism, the following passages from the recent able work on Hygiene, before quoted. The remarks there made, though written for the metropolis of Great Britain, are equally applicable to New York, Philadelphia, or any other large and crowded city.

“In all large cities and towns there are plague-spots where fever of the intermittent, remittent, or continued form always prevails in greater or less intensity. There are districts and localities in our modern Babylon which are ever remitting the poison which generates Typhus Fever; there are certain squares and streets, nay, particular houses, the inmates of which, family after family, for a long series of years, have been the victims of Typhus Fever, though the districts in which they are situated are airy, and the soil dry.

“Open and imperfect sewers, faulty, superficial, choked up, and overflowing drains, imperfect traps of cess-pools and water-closets, a filthy condition of the earth's surface, together with intramural burying-grounds, slaughter-houses, and slaughtering-cellars, and the conversion of tidal rivers into cloacæ maximæ, are the fruitful sources of fevers, diarrhoea, and dysentery, in all congregations, and on any one spot, of great multitudes of human beings.

“There is probably no subject so complex, so incalculably difficult to grapple with, especially if it be how to apply a remedy, as the drainage and sewerage of large overgrown cities. Yet, we must perceive, that unless this be efficiently done, an *ultimate limit is set by the hand of man himself to dynasties, to peoples, and to nations.* The air we breathe, loaded with carbonaceous matter, sulphurous and sulphuric acid, sulphate of ammonia, and sulphuretted hydrogen, is deprived, by the absence of vegetation, of the revivifying principle oxygen, and is hence less fitted for the necessary changes of the blood effected during respiration. The earth which we tread under our feet, loaded with the ashes of our forefathers, and rich with the remains of animal and vegetable matter of ages long gone by, saturated with putrefying contents of myriads of cess-pools and leaking sewers of our own day, emits at certain seasons of the year the poisonous emanations which generate Typhus, Diarrhoea, Dysentery, and Cholera; whilst the waters of our principal tidal rivers, converted into open common sewers, teem with pestiferous exhalations, charged with the germ of disease, or the messenger of death. If, under these favoring conditions, a pestilential epidemic invade our shores, it finds us an unprepared and easy prey.

“The government of every state and nation would do wisely to appoint a minister of public health, whose duty it should be to superintend and watch over the health of the community at large, to see that due ventilation is observed in all large

and public buildings, and in the dwellings of the poor ; to ascertain that the water is pure, and its supply ample ; to prevent all noxious and unwholesome trades and manufactures being carried on within a given distance from towns and dwellings ; to prohibit intramural burial-grounds, slaughter-houses, and slaughtering-cellars ; but, above all, to lay down, and carry out an effectual, efficient, complete, and common-sense plan of drainage and sewerage for every town and city.

"Were the fearful consequences which result from the reprehensible practice of converting our rivers into open common sewers but thoroughly understood, and properly understood, and properly estimated by the public, no expenditure of time or money would be deemed too great to put an end, by penal enactment, to a system so disgusting, so revolting, and so destructive to the health and lives of the community at large ; but more especially of those whose avocations necessitate their daily and hourly exposure to, and residence in the midst of its pernicious influence.

"Unless this monstrous and suicidal evil be staid, London will ultimately become the hot-bed of plague and pestilence, and will, as a consequence, be depopulated and deserted, and numbered with the cities of the world which have been. Then, perhaps, may be fulfilled the prophetic visions of Volney, of Walpole, of Shelley, of Macaulay, 'when London shall be an habitation of bitterns, when St. Paul's and Westminster Abbey shall stand shapeless and nameless ruins, *in the midst of an unpeopled marsh* ; when the piers of Westminster Bridge shall become the nuclei of islets of reeds and osiers, and cast the shadows of their broken arches on the solitary stream ;' or with Macaulay, 'when travelers from distant regions shall in vain labor to decipher on some mouldering pedestal the name of our proudest chief ; shall hear savage hymns chanted to some misshapen idol over the ruined dome of our proudest temple ; and shall see a single naked fisherman wash his nets in the river of the ten thousand masts.'"

REPORT
OF THE
IMPORTANCE AND ECONOMY
OF
Sanitary Measures to Cities.

BY JOHN BELL, M.D., OF PHILADELPHIA.

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REPORT

This is one of the subjects to which the Committee on the Internal Hygiene of Cities has been specially instructed to direct its attention. It is that on which, in the division of labor, I am required to be the reporter. The materials for the purpose are ample, and it only requires the labor of selection and arrangement, to make them available for immediate instruction and guidance in the work of sanitary reform. History, notwithstanding its imperfect notices of the real condition of the people of the different countries whose progress it professes to narrate, furnishes, when read and studied in a proper sense, large contributions. More especially is this true with regard to contemporary records, which, while they manifest awakened attention to existing evils, point out at the same time the means of amelioration and improvement. In the use to be made of the knowledge obtainable from so many different sources, and to be brought to bear in aid of sanitary reform, it will be safer to incur the charge of iteration rather than of failure to impress the public mind with the vast importance of the questions involved in the discussion, and with the pertinency and force of the facts adduced in elucidation of principles. We must not imagine that a knowledge of sanitary matters, possessed by a small number of intelligent and inquiring minds, is at all indicative either of the knowledge or the zeal of the public at large. Our reform, like every other that has been successful, requires iteration, and again iteration.

Ancient Egyptian Hygiene.—The mere mention of ancient Egypt suggests to the minds all of readers, her pyramids and obelisks, with their hieroglyphics, the splendor of Thebes and

Memphis, the superstitious observances of her people in their alleged worship of animals, and of their embalming the dead, both of their own and the brute kind. The annually overflowing and fertilizing Nile, with its innumerable canals for irrigation, is also a theme for admiration. But the wise sanitary measures which secured health to the inhabitants, and their protection from pestilence, by a system of irrigation and methodical distribution of the waters of the great river, and the practice of embalming the dead, under religious sanction, are scarcely deemed to be worthy of notice by the historian; certainly they are not impressed on the minds of the youthful student in such a manner as is called for, both by the importance of the facts themselves, and as suggestive of the duty of a government to exercise unceasing vigilance in all matters that relate to public hygiene. Unless the process of converting the dead bodies, not only of men but of animals also, into mummies, had been in a great measure universal, it would have been difficult to prevent putrefactive exhalations from continually filling and poisoning the air, owing to the difficulty, not to say impossibility, of securing deep and permanent burial for the dead in a land like that of Egypt, the soil of which is undergoing continual changes of surface by the annual overflow and washing of the Nile. With a similarly wise provision of means best calculated to preserve the public health, one, if not more of the ancient kings, made those great artificial excavations, the lakes of Moeris, the effect of which was protection against the impetuous flow of the Nile at its rise, or the too persistent delay of its waters at its fall; and, in either case, to diminish, if not entirely prevent, an exposed marshy surface with its deleterious exhalations.

Carthaginian Hygiene.—We are all familiar with the memorable incidents of the wars growing out of the rivalry between the Romans and the Carthaginians; but few are

aware that paving the streets was first practised in Carthage, and that the example was followed by the Romans, or that a copious supply of water for the use of the inhabitants of that city, was brought, after immense labor and expense, by an aqueduct more than fifty miles in length, and of such dimensions that a man could stand erect in it. The cisterns for the reception and distribution of the water through the city were of corresponding magnitude; and even now in rowing along the beach, the mouths of common sewers are frequently discovered. In a like spirit of regard for the public health, the Carthaginians set apart ground for a public cemetery, beyond the suburbs of the city, which became a true Necropolis, a city of the dead, of which notice will be taken when we come to treat of the evils of intramural interments.

Public Hygiene of Ancient Rome.—Favorable as the site of ancient Rome, extending over her seven hills, might at first appear for early habitation and defense, it may be safely said that we should never have heard of the eternal city, never would she have become mistress of the world, if her rulers and people had not early felt the importance of sanitary measures, and carried them out with a persistence and an ability which should serve as models for all succeeding ages. Much of the ground between the hills was little better than a swamp, owing to the trickling down of the small springs from above, and to the frequent overflowing of the Tiber. Unless, therefore, the ground could have been thoroughly drained, it must have remained, in a great measure, uninhabitable; and the seven hills would have continued to be the seat of merely so many separate villages, the abode and refuge of a half-shepherd, half-robber population, who had the Capitoline hill for their citadel; and Rome would have barely acquired the rank of an inferior Latin city, under the rule of her neighbor and subsequent rival Alba Longa.

The Cloacæ.—With not only an intentness to meet existing wants, but with apparently a prescience of the future greatness and dominion of Rome, the work of drainage and sewerage was begun by her kings and continued during the republic on a scale of such magnitude, and in a manner so enduring, as to be unsurpassed and rarely equaled by any subsequent labor of the same kind in other countries. The *Cloaca Maxima* which carried off the waters of the *Velabrum*, at the time a marsh between the Tiber in one direction, and the Capitoline, Palatine, and Aventine hills in another, rivals the largest of the pyramids in solidity and amount of material, and exceeds them all in unquestionable utility. The inner diameter of this river-like trimural sewer was more than thirteen feet, and such as to allow it to receive other large affluxes. "Earthquakes, the pressure of buildings, the neglect of fifteen hundred years, have not," writes Niebuhr, "moved a stone out of its place; and for ten thousand years to come, these vaults will stand uninjured as at this day." The Minor *Velabrum* was continuous with the marshy districts, known afterwards as the Forum and the Suburra, which were drained by appropriate tunnels opening into the main trunk. In the centre of the Minor *Velabrum* was a bog or swamp called lake Curtius, which was long an unabated and unmanageable nuisance. The myth of Marcus Curtius sacrificing himself for the good of his country, by plunging, mounted and armed, into this yawning abyss, which was henceforth closed forever, would, if clothed in the language of sober reality, probably read as follows, in the style of an obituary notice: "Marcus Curtius, edile, while superintending day after day, the drainage and filling up of the unsightly and insalubrious Minor *Velabrum*, and being exposed all the time to the fervid rays of an autumnal sun, contracted a pestilential fever, under which he sank, a martyr to his love for Rome, to whose welfare he gave his life as a sacrifice. Peace to his manes! Eternal honor to his memory."

All these reclaimed marshes became memorable in the history of Rome, as sites for many of her most useful and ornamental buildings and streets. In the Velabrum were constructed the cattle and fish markets, *Forum Boarium* and *Forum Piscatorium*, the temples of Fortune and Vesta, the *Arcus Quadrifrons* and the *Circus Maximus*. The *Forum*, long known by that simple designation, and afterwards called *Forum Romanum*, was a place for public meetings, and also a market-place; it was surrounded by buildings of various descriptions, both useful and ornamental; shops, arcades, columns, triumphal arches, and temples. This is not the time to speak of the historical associations of the Roman Forum, where the Comitia were held, where Cicero harangued, and where the triumphal processions passed. The once remote and marshy suburban village, the Suburra, became after its drainage and the desiccation of the soil, the site of the amphitheatre of Titus Vespasian, more generally known as the Coliseum, and the triumphal arch of Titus.

But, notwithstanding all the pains and expense lavished on the vast subterranean drains (*cloacæ*), it was always a matter of extreme difficulty to keep the ground of the Velabrum and the Suburra sufficiently dry to be healthy; and hence these quarters were the residence of the *plebs* or commonalty. Julius Cæsar, in the early part of his career, occupied an humble house in the Suburra. Of a similar marshy nature was the plain lying between the Tiber and the Pincian, Quirinal, and Capitoline hills, on which a good part of modern Rome has been built. Part of this plain, in an early period of ancient Rome, was cleared of trees, and made a field for gymnastic exercises and feats of mimic war (*Campus Martius*). Large groves were, however, retained, among which Augustus erected the Mausoleum called after him; and behind it beautiful walks were laid out. Another part of the plain was covered with innumerable palaces, wooded gardens, three

theatres, an amphitheatre, and magnificent temples, contiguous one to another. To have drained this district, as a necessary preliminary for such various and splendid constructions, must have been a work of considerable labor and time, as we have an opportunity of learning from the experimental observations of an eminent Italian savant (*Brocchi*). He shows that, at any spot over the whole plain, water is readily procured at the depth of a few feet from the surface, and in such quantity as to furnish, were it necessary, an adequate supply to the whole city. by means of wells, and without having recourse to the aqueducts. With a knowledge of the buildings which bordered the Campus Martius on three sides, and the still more numerous and imposing ones in the Forum and the Suburra, previously noticed, we see the necessity for completing the simple yet extensive underground constructions in the way of sewers, before a firm foundation could be procured for the more various, massive, lofty, and ornamental edifices erected on the surface. The lesson is a fruitful one, and ought never to be lost sight of in the founding and laying out of new towns. In many of these a proper system of drainage and sewerage is an after-thought, and hence when executed, it is at an immense cost, and often after much sickness, suffering, and mortality among the first inhabitants.

Pestilential Fevers.—*Paving*, the necessary accompaniment of sewerage, and without which the latter must always be imperfect, was not begun in Rome until an advanced period of the republic, when the practice was said to have been adopted from the example of the Carthaginians. The early deficiency in this respect, and the inadequate supply of water for washing out the sewers, allowed of the extrication and escape of effluvia, which, added to the exhalations from an exposed and wet surface, still in part subjected to overflow of the Tiber, gave rise to those epidemic and aggravated periodical fevers, which

under the vague name of plague (*pestis*) ravaged the city and the *Ager Romanus*, now the *Campagna di Roma*, at different times, and carried off large numbers of their inhabitants. The state of war in which the Romans were, with the exception of short intervals, so constantly engaged, must have complicated the features and augmented the violence and fatality of these pestilences. Without professing to have made antiquarian or much historical research, it seems to us that these visitations were not so destructive in the latter years of the republic, and under the first emperors, notwithstanding the greatly increased population of the city, as they had been under the kings and in the first centuries of the republic. The difference in these respects must be traced to the extended system of paving and of sewerage, and the abundant supply of water brought by the aqueducts. Brennus at the head of his victorious Gauls, after having held possession of the city for six or seven months, during which period he laid close siege to the Capitoline hill, on whose summit the surviving citizens had taken their last stand, was finally obliged to retire, owing to the sickness that destroyed so many of his soldiers, much more than to the gold with which it was said he was bought off. The Gauls encamped around the Capitoline hill, in the Forum and the region of the Velabrum, were unavoidably exposed to the causes of fever growing out of this low and unhealthy situation, acted on by the fervid rays of a summer and autumnal sun. Reference has been already made to the ground in this region being sometimes overflowed by the Tiber; and we may now add, that, even as late as the time of Augustus, it was, on such occasions, impossible to pass from the Palatine to the Aventine mount without the aid of a boat, for which each passenger paid a *quadrans*, or about a cent of our money.

The Aqueducts.—On an equally large and magnificent scale with the subterranean conduits and galleries for the

purpose of sewerage, were the numerous aqueducts which traversed Rome in all directions. They were nine in number, and conveyed into the city, at distances varying from seven to sixty miles, a supply of water adequate for both public and private uses—cleansing the cloaques, supplying the numerous baths, and naumachiae, and the houses for all domestic purposes. One of these aqueducts, the Martian, conveyed the waters of three separate streams in as many channels. The first aqueduct, made in the fifth century from the foundation of Rome, was almost entirely subterranean. In such cases, openings to the external air were made at intervals of 241 feet, for the purposes of ventilation. With the growth of the city, and the extension and multiplication of the sewers, it became more than ever an object to keep these underground passages free from obstructions, and hence whether Rome was at war or at peace with the neighboring states, the government, both in the time of the republic and in that of the empire, exercised unceasing vigilance, not only in these important matters, but in every thing that bore relation to the public health. The comprehensive jurisdiction of the ediles indicated the supervision, as well of public buildings—temples, theatres, &c.—as of private edifices, to such an extent that they should neither endanger nor incommode passengers on the streets, but also of baths, aqueducts, common sewers, and control of the markets and houses of public resort—taverns and hotels, as we should call them at the present day. The ediles took care that the health of the people should not suffer by bad provisions, which they threw into the Tiber, nor their morals by bad women, whom they had authority to banish from the city. Officers were also specially appointed to take care of the aqueducts. These *Curatores Aquarum* were invested with considerable authority; being attended, when they went out of the city, by an architect, secretaries, two lictors, three public slaves, &c.

After reading the account given by Strabo of the quantity of water introduced into the city being so great that whole rivers seemed to flow through the streets and sewers, what a contrast is offered to our minds when we turn over the pages of the Parliamentary reports made a few years ago, showing the lamentable deficiency in this respect both in London and many of the great and even small towns of England. To such an extent did this prevail, that hundreds of thousands were deprived not only of an adequate supply for washing their clothes, and for purposes of personal cleanliness, but also for drink itself. The only fountains to which they had access were those of liquid poison; the only edifices to rejoice their eyes, and to which they might claim entrance, by spending the pittance earned by their daily toil, were gin-palaces. In most of our cities on this side of the Atlantic, provision has been made for an abundant supply of water for the use of their inhabitants; and our municipal authorities might, with propriety, repeat the language of Augustus, who, in reply to a popular clamor about the dearth and scarcity of wine, reminded the people of Rome, "that no man could reasonably complain of thirst, since the aqueducts of Agrippa had introduced into the city so many copious streams of pure and salubrious water." There is reason to fear that this appeal in favor of the unsophisticated appetite for water, as contrasted with the acquired relish for alcoholic stimulants, would be received with as little favor in the Christian capitals of Europe and America, as it was in pagan Rome.

Agrippa.—There is no name in Roman history and records so eminent for his numerous and extensive additions to the chief means of promoting the health, as Agrippa, the son-in-law and most trusted counselor of Augustus. He increased the number of the public sewers, and exercised a continual and careful super-

vision over all of them. So numerous were these subterranean galleries, that the entire city might be said, in the language afterwards used by Pliny, to be suspended over innumerable arches (*urbs pensilis*). Agrippa contrived, in addition to other means, to collect several minor streams into a larger one, and to divert the entire current into the sewers, so as, in a measure, to flush them, as we would say nowadays, and thus to drive before it all refuse and fetid accumulations. He carried his supervision so far as to see in person to the cleaning out of the sewers, for which purpose he used to enter some of them in a boat. The civil authorities of Rome displayed continued watchfulness, in order to prevent the waste of water brought by the aqueducts; and, among other laws to this effect, there was one which prohibited the diverting of the water, that flowed over the *castella* or reservoirs at the termination of the aqueducts, to private purposes, to the detriment of the health of the city, by thus preventing the washing out of the sewers. By the like attention to drainage and cultivation of suburban districts, and indeed of all Latium, the country was rendered in a great measure healthy, and became the favorite retreat of the wealthy Romans during the hot season. These delightful villas could not, even if they were yet entire, be now inhabited, on account of the altered condition of the soil, and its alleged consequent extrication of the pervading and destructive malaria.

Following the construction of the aqueducts, and the introduction of so great a body of water as was conveyed by them into Rome, was that of the *Public Baths*, some of which, as those of Diocletian, were almost small towns, comprising, as they did, every kind of structure for bodily exercise, religious worship, reading, and recreation, in addition to the vast lavacra, and other appliances for bathing in water, vapor, or hot air, as taste or the bodily health might require. Some reference will again be made to these establishments, towards the close of this report.

Barbarism and Civilization.—History tells us of the immense population of ancient Rome at the height of her power, and the villas which overspread the surrounding country; both town and country preserving and maintaining a vigorous and unremitting observance of the laws enacted for the public health. From the same source we learn the melancholy and contrasted picture of Rome, fallen, depopulated, and rendered almost desolate by her barbarian invaders, and the consequent entire neglect of all sanitary legislation. Such was the wide-spread ruin which followed the repeated irruptions of barbarian conquerors and despoilers, Goths, Huns, Vandals, and Lombards, that, in the eighth century, as we read in the pages of the learned and accurate Muratori, a considerable part of Italy was covered with forests and marshes of great extent, and infested with wolves and other wild beasts. The same state of desolation prevailed in other countries of Europe. Rome herself, fallen from her high estate, exhibited the melancholy spectacle of a great city in ruins; the adjacent country a gloomy solitude, and disease reigning supreme over the surviving inhabitants. Plundered first by Alaric, and spared by the ferocious Attila, who had laid waste the whole empire, her greatest sufferings were caused by Totila, who besieged Rome, and cut the aqueducts, in order to facilitate the capture of the city. By this means the country around was overflowed, ponds and quagmires were formed, and the air became in consequence poisoned. The Lombards exceeded, if possible, those who had gone before them in the work of destruction, in which we must include that of drains, dikes, and sewers. Even if these had not been destroyed or closed up by foreign enemies, there were not inhabitants left in sufficient number to keep them entire and to cleanse them. With progressive barbarism and decay of all the useful arts, a knowledge of the very existence, and, consequently, of the direction of most of the sewers,

was lost. There was no longer any police, nor the commonest attention to public hygiene. Frequent references were made, in successive centuries of the dark or middle ages, to the stagnant waters in the vicinity of Rome, and their retention in the vaults and the ruined buildings of the city, as a constant cause of taint of the incumbent air. During the twelfth and thirteenth centuries, few of the inhabitants of Rome reached the fortieth year of life, and a very small number survived the sixtieth year. On the advance of the Emperor Frederic Barbarossa on Rome, it was asserted by a writer at the time, that its pestilential air offered a better means than its soldiers, of protection to the city against an enemy. When the Popes returned to Rome, after an absence of seventy years (1306 to 1376) in Avignon, the city only contained thirty thousand inhabitants. This return became the signal for setting about the work of restoration and improvement, and among the measures of this nature most contributive to the public health, was the construction of new and the repairing and opening some of the old sewers. Noticeable evidences of improvement in the sanitary condition of Rome, effected by drainage, were presented in the changes wrought in the quarter of the Vatican, and in that corresponding with the ancient Campus Martius. The first, in the time of Tacitus, was eminently unhealthy, owing to the marshy nature of the ground; but it was so much improved in this particular by the Popes, as to be made the site for the Church of St. Peter and the Palace of the Vatican. In fact, many of the largest churches and finest palaces in modern Rome are so many evidences of conquests over marshy ground, in order to give space and stable foundation for their erection, and also, to render access and occupation easy and safe. Modern Rome, through the Popes, has in part imitated and in part turned to direct account the construction of the ancient aqueducts, so that by means of three of these art-directed rivers, the city is

amply supplied with water, not only for the domestic and personal wants of the inhabitants, but for the purposes of cleansing the streets and supplying numerous fountains. The gushing streams and jets sent out from these last, diffuse a grateful coolness through the surrounding air, during the raging and oppressive heats of summer. The most rigid Protestant, in going the rounds of sight-seeing during the dog-days, must feel his *odium theologicum* oozing out at every pore as he approaches the magnificent fountains of *Termini*, of *Trevi*, and of the *Piazza Navone*, formerly the *Circus Agonalis*, or sees a river foaming like a cataract at the *Pauline*.

The calamities which followed the irruption of the German and Scythian nations into the Roman empire, lasted for four centuries; and during this period it were vain to talk of public hygiene. No longer were ediles and questors to be found, nor were similar officers created by the barbarian conquerors. Even after the outlines of a new order of things were visible, and modern history began its records, a long time elapsed before any pains whatever were taken to preserve the health of communities by sanitary regulations. The cultivators of the soil, herding rather than dwelling together round the castle of their lord and tyrant, were badly fed and worse lodged; and both in town and country the purifying aid of the bath ceased to be sought for, and in fact was no longer procurable. The first memorable step towards a better social and political organization of the people who overran and subjugated the Roman empire, was their collection into commercial communities. Ingenuity, enterprise, and taste were rapidly developed; and with the increase of the wealth of the state there ensued greater individual comfort and enjoyments—better means, in fine, of procuring health, and avoiding disease. To huts, and dark and unwholesome habitations, succeeded spacious, if not always well-aired and well-lighted mansions; and avenues obstructed by mud and filth were re-

placed by paved streets ; while here and there a fountain gave evidence of a recognition of the virtues of running water, and rendered it probable that abundance for use was secured before indulgence in ornament was allowed. This ameliorating process was chiefly observable in the free cities of Germany and Italy ; and it was after a much longer period that even the capitals of powerful kingdoms, such as London and Paris, were wanting in most of the essentials for the preservation of the public health. The streets were narrow and unpaved, and with their own mud were mixed up all kinds of garbage and offal ; the houses were for the most part small, damp, and badly ventilated ; water for both public and private wants, household and personal, was deficient in quantity ; and when procured often tainted with impurities. The supply of food was irregular, and never in the variety required for the purposes of health. In all the cities of Europe, in the middle ages, the population was excessive, owing to the insecurity of persons and property outside the walls during their frequent and almost continual wars, and to the consequent flight of large numbers from the country, who sought refuge in the city from the sudden fury of a barbarous enemy. It mattered but little whether the town were large or small ; there was always a disproportion between the number of its inhabitants and the space for habitation and change of air. Hence we cannot be surprised that any noticeable deviation from the customary states of the atmosphere, or, still more, interruption to the regular supply of food, should have been followed in city, town, and hamlet, with pestilence in its most appalling and deadly forms. Even if we were ignorant of all the particulars of bad medical police, or of its entire neglect, and of the mode of living during this period, we still could not fail to see in these melancholy chapters of the devastations from epidemic diseases, a want of adequate public hygiene, if not a total ignorance of its principles. In propor-

tion, on the other hand, to more conformity with, and a better appreciation of, these latter, was there an abatement, if not entire disappearance of these scourges of mankind. Sanitary measures, methodically carried out, were followed by improved public health and increased duration of the life of the individual.

Vital statistics enable us to speak with confidence of the progressive ameliorations, in these respects, which accompanied advancing civilization. The mortality in Paris in the early part of the fourteenth century has been estimated from a manuscript document to be 1 in 20; whereas the average mortality of the inhabitants of that city, in the very poorest arrondissement or ward, as we might term it, in which poverty and destitution are extreme, was 1 in 24, in the first third of the present century. The average deaths in all Paris at the same date (1830) was 1 in 32, and among the more wealthy inhabitants, 1 in 42; and hence we are safe in saying that the mechanic of the present day, who resides in the French capital, is better off on the score of air and the appliances for supporting life, than the rich inhabitant at the opening of the thirteenth century, notwithstanding that the population is more than 300 times greater now than it was then. The difference in the vital statistics of the two periods thus compared is easily explained by the entire neglect of public hygiene in the former, and the careful attention which it receives in the latter. Although paving of the streets of Paris had been begun in the twelfth century, under Philip Augustus, yet it was of very limited extent at the beginning of the fourteenth, when Philip the Fair was king. At that time the streets of Paris gave out abominable stenches, so obstructed where they with mud, dung, and other excrementitious substances and offal of all kinds. Even towards the close of the century things were no better, if we may judge from a proclamation of Charles VI., which speaks of the pavement being so broken up into ruts, that it was dan-

gerous in many places to ride either on horseback or in a carriage; and that, owing to the accumulation of refuse of all kinds, grave diseases and death were common. With few exceptions, the houses were little better than hovels. Even down to the early period of the reign of Louis XIV., the greater number of the streets were still unpaved, or paved only on one side and at certain distances; they were obstructed also by the same kind of abominations already mentioned. Historians remark that, after the paving of Dijon, the ancient capital of Burgundy, in the middle of the fourteenth century, dysentery, spotted fever, and other diseases became of less frequent occurrence in that city. A still more striking example of the effect of improved sanitary legislation in increasing the average duration of human life, is exhibited in the registration of the births and deaths, and of the population of the city of Geneva, during the last three centuries. M. Marc d'Espine, in a late work on "Comparative Mortuary Statistics," shows, that the *probable* life at Geneva in the sixteenth century was rather less than 5 years; in the seventeenth century 11 years; at the beginning of the eighteenth 27 years; at the end of the century 32 years; and now it is 44 years. M. Mallet had previously ascertained from the same documents, that the mean duration of life in Geneva, in 1833, was nearly the double (or as 40 years 5 months to 21 years 2 months) of that reached rather more than two centuries before.

Causes of Pestilence.—Nearly all the great cities of the world have been founded on the banks and at the confluence of rivers, or on the sea-shore, where the ground is low, flat, and often marshy, and liable to be in part flooded by heavy rains, or the overflow of adjoining rivers. In localities like these, almost invariably at particular seasons, and under certain regularly recurring atmospherical influences, fevers of a periodical kind afflict the first inhabitants. It was so, as we

have already stated, at Rome; and in the cities and small towns, too, of modern Europe, as well as those in America, the same unfavorable localities have produced the same effect, until the industry and art of the inhabitants have been exerted to alter the surface of the ground by firm pavements and judicious draining, so that the water coming from the houses, and that falling in the streets in the shape of rain, shall readily flow into the sewers beneath, in place of being allowed to stagnate in ruts, hollows, and pools, and afterwards, with the aid of heat, to bring about a putrefactive fermentation of all the refuse accumulated, in the shape of vegetable and animal offal, and other matters which are thrown or otherwise find their way into the streets. A compost thus formed of all kinds of abominations, in union with the filth retained in most of the houses of Europe during the middle ages, was a perpetually sustaining cause, not only of periodical fevers, but of plague itself. The materials of wood, and lath, and plaster, of which the houses were chiefly built, by retaining moisture and yielding to decay, must have greatly contributed to the evolution of foul and unwholesome air, which was added to the permanent supply in the streets. Fire in some instances came opportunely to purify the air, while it destroyed the dwellings in a city. The great fire of London in 1665, which followed the great plague, destroyed thirteen thousand houses and eighty-nine churches, in four hundred streets; but it left the English capital free, ever after, from the plague. The benefits would have been much more complete if the streets had been laid out after a general and uniform plan, instead of preserving the old lines, although many of them were made wider. To this last circumstance, and the better construction of the houses, both as regards the material, brick, and the larger access of light and air, was the new city indebted for a higher sanitary standard than it had ever attained before. But the imperfect paving and drainage of London still left it open to intermittent

fever and dysentery, both of which prevailed every year. It will surprise many persons, general readers too, when they are told that the mortality from the former cause alone, in a population at the time not greater than that of Philadelphia, was from one to two thousand persons annually. Now, it scarcely figures on the mortuary list, owing to the great sanitary improvements in the metropolis, especially under the heads just mentioned. In former times, it appears that Walbrook, Sherbourne, Longbourne, and Oldbourne, were really brooks, often closed up by filth, and in some places the currents so much obstructed as to form pools. A large portion of the country also, around London, was a marsh, and indeed the banks of the Thames, from Lambeth to Woolwich, was one continued swamp. All these parts, however, have been underdrained, extensive sewers formed, the ditches filled up, the river banked out, and the site generally rendered so dry, that London is now unquestionably not only the most healthy capital in Europe, but on the score of salubrity, is scarcely rivaled by any city in the world.

Venice.—We have been accustomed to read and to speak of the wonderful and almost miraculous progress of Rome, from a small and insignificant beginning to universal empire, and to expatiate on the firmness, courage, and martial spirit of her people, which bore them up under the most trying and adverse circumstances. Viewed under another, and hygienic aspect, her career must excite our surprise and admiration to a still greater extent, when we reflect on the eminently unfavorable geographical situation of the city, as every way adverse to health, and to the growth in numbers, wealth, and splendor which she ultimately attained. It would indeed be difficult to adduce a stronger and more convincing proof of the importance of sanitary measures, not only for the prosperity, but for the existence of a city, than was exhibited in the history of Rome. But in more modern times the same instructive lessons have

been taught, with even greater force and point, by the foundation and growth of the three great cities of Venice, Amsterdam, and St. Petersburg. Had the refugees from the mainland, who fled, before Attila and his Huns, to the small islands in the lagunes of the Adriatic, hesitated to procure a stable and permanent abiding-place for themselves amid the waters, and to set about laying at once the foundations of a mart for commerce, they might, perhaps, have had a line in history, telling of their love of freedom and of their success as fishermen and buccaneers, but never would the world have heard of the name of Venice, or of its extensive trade and political power. Never would the spectacle have been exhibited of a great city rising as it were out of the sea, and resplendent with marble palaces, and churches, and piazzas, and with rich tessellated pavements, and houses, many of them, palatial in size and architectural decorations, and nearly all of these edifices, both public and private, built on piers. There was pavement-foundation of a new kind, and upon a large and costly scale; but how fully was the expense repaid! Where canals take, in most cases, the place of streets, these are necessarily small, if not insignificant; but their pavements required a heavier outlay than that of many of the broad avenues of other cities. What shall be said of the engineering skill in making the canals, and in preserving their requisite levels, as well as of the labor in preventing undue accumulations of offal and refuse of all kinds cast into them. The entire exemption of the inhabitants of Venice from periodical fevers, is well calculated to excite surprise under any view which may be taken of the peculiar topographical features of the city. During the summer months the lagunes give out very unpleasant odors.

Amsterdam had as small and unpropitious beginning as the Queen of the Adriatic, and like that of the latter, it was a maritime one. Its founders were, first, a few fish-

ermen, and then a few traders, whose early efforts were directed to prevent them from sinking in the morasses on which they had erected their humble dwellings, and from having these swept away by the sudden rising of the stormy Zuyder Zee. Drainage by canals gave them something like *terra firma* in their marshes, while dykes sheltered them from the capricious fury of the ocean. Industry and enterprise thus early exercised were not long in being directed into the channels of an extensive and lucrative commerce, which brought the inhabitants wealth and a mercantile marine. Its tonnage constituted a large part of that of the Seven United Provinces, and this, at the close of the seventeenth century, was nearly equal to the tonnage of all the rest of Europe. Amsterdam presents the spectacle of a flourishing and handsomely-built city, of more than two hundred thousand inhabitants, with well-paved and clean streets, which sometimes run parallel to, and sometimes are intersected by, numerous canals, and with public and private edifices evincing durability, taste, and wealth. The whole of them rest on piles; and hence the common remark, assuming the tone of complaint, that a house costs as much below as above the ground. It should be remembered, however, that a house is worth little above-ground anywhere, as a residence, unless the under-ground be well kept, and rest on a dry and properly-drained soil. Notwithstanding, however, all the pains taken to keep the canals of Amsterdam clear of accumulations of filth or other obstruction, the depth of water is often insufficient to prevent offensive and injurious exhalations, which affect the health and lessen the mean duration of the life of the inhabitants. What is here said of Amsterdam applies to nearly all Holland. The people of that country, inhabiting a barren soil, alternately marsh and sand, and almost submerged by water, and breathing an atmosphere the most unfriendly to human comfort, so far from retiring before the encroachments of the ocean, erect barriers to restrain

its fury, give new channels to their sluggish waves, drain by numerous canals their marshes and morasses, and convert, as it were, the elements which seemed to be the means of destruction, into so many sources of wealth and power.

St. Petersburg, the capital of the Russian empire, rests, like Venice and Amsterdam, on made ground, once an area of marsh and bog, near the mouth of the Neva. Its foundation, unlike, however, that of the free cities just named, was owing to the despotic will of one man, Peter the Great, who triumphed over nature, but at an enormous sacrifice of human life. History tells of forty thousand men having been employed at one time in the preliminary work of draining of the soil, and filling up pools and quagmires; and of three hundred thousand men having lost their lives before the work was completed. Now, we look at a magnificent capital, containing a population of half a million of souls, with its wide and long streets, its grand stone quays extending for three miles on each side of the Neva, its apparently endless lines of imposing houses in a uniform style of architecture for entire blocks and even streets, interspersed with churches and palaces and government edifices. All this has been created within the period that has elapsed since the foundation and first settlement of Philadelphia. Well might it be said, after a study of the rise and growth of all the great capitals and celebrated cities of the world, that the first and the most important chapter in the history of civilization is that of drainage. If there be exceptions, they will be found, for the most part, to strengthen and enforce the general practice, by showing the inconveniences and loss caused by its neglect.

Berlin.—As a part of the contrasted picture of neglect of the most important measures of sanitary legislation in cities, we may adduce the instance of Berlin, the capital of Prussia. For the first half of the seventeenth century, its streets were

not entirely paved ; and at the beginning of the century they were never swept. The new market was paved as late as 1679. How different the state of things in the commercial and free city of Augsburg, the paving of which was begun in the early part of the fifteenth century ; and in the earliest periods it had subterranean passages or sewers. In Berlin, on the other hand, in the latter part of the seventeenth century (1671), every countryman who came to the market was required to carry away with him a load of dirt. Hog-styes were erected on the streets, sometimes under the windows. Berlin had no regular sewers or underground drains at as recent a date as 1846. A sluggish but considerable river, the Spree, almost stagnates in the town. It might be made a grand cloaque, connecting with the other drains when covered, and the whole of them, as well as the streets, could be washed by water raised by engines, at a cost not greater than that now incurred for stucco work, and other outside decorations for the houses. Large puddles of filth are allowed to collect before the doors even of the best houses, which, especially in the last months of summer, diffuse a most horrible stench. It must be admitted, however, that the low situation of the town renders drainage a matter of great difficulty. Laing, the traveler, speaking of Berlin as he found it 1841, says : " It is a fine city, very like the age she represents—very fine, and very nasty. The streets are spacious and straight, with broad margins on each side for foot-passengers ; and a band of broad flag-stones on their margins, make them much more walkable than the streets of most continental towns. But these margins are divided from the spacious carriage-way in the middle by open kennels, telling the most unutterable things. These open kennels are boarded over only at the gateways of the palaces, to let the carriages cross them, and must be particularly convenient to the inhabitants, for they are not at all particularly agreeable." " If bronze and marble could smell, Bluch-

er and Bulow, Schwerin and Ziethen, and duck-winged angels, and two-headed eagles innumerable, would be found on their pedestals, holding their noses instead of grasping [as in the case of the generals] their swords." Berlin is still so far behindhand in the comforts of life, as not to have water conveyed in pipes into the city and the houses. "Three hundred thousand people have taste enough to be in dreamy ecstasies at the singing of Madame Pasta, or the dancing of Taglioni, and have not taste enough to appreciate or feel the want of a supply of water in their kitchens, sculleries, drains, sewers, and water-closets." No surprise need be felt that Berlin was scourged with the cholera in 1831, and again with still greater severity in 1837. Putting aside drainage, the Prussian capital is, in the width and general arrangements of the streets, and the better ventilation of the houses, superior to the French; but yet the proportionate mortality from Cholera was much greater, or at the rate of nearly $2\frac{1}{2}$ to 1 in 1831, in the former than in the latter city—which, as commonly described, was so great a sufferer. In the second attack (in 1837), the mortality was still heavier in Berlin, or, as the difference between 1426 and 2174 deaths. There, as in nearly every city in which the Cholera made its attack, the greater number of cases, and the chief mortality, were found in dark, narrow streets, inaccessible to the rays of the sun and to winds, and in low, damp habitations, especially near the water.

Neglect of Sanitary Legislation.—During the last two centuries, colonization and incidental conquest have exerted a powerful influence on the political and social relations of the different countries in both hemispheres, from which neither Hindoo nor Chinese, Turk nor Tartar, Indian nor Negro are exempt. Consequent upon the vast extension and the openings of new channels of commerce, have been the foundation and growth of many cities, the inhabitants of which, in their

eagerness for gain, have hardly allowed themselves, until recently, time to attend to the obvious requirements of public hygiene. Looking too much at the surface, they have often neglected proper draining and sewerage, and the means of procuring an adequate supply of water; and, more surprising still, a renewal of fresh air by suitable ventilation. The consequences of this neglect have been the production of febrile and other diseases, which have not only destroyed life to a fearful extent, but retarded industry and greatly interfered with social progress and educational amelioration. These evils are not confined to Calcutta and New Orleans, to Cairo and Constantinople; they are but too apparent in Liverpool and Manchester, and Glasgow, and New York; and, although in less degree, in Boston, Philadelphia, and Baltimore, not to speak of our great inland towns on the Mississippi and its tributaries, and on our great Lakes. Little admonished by the history of former ages, the people of Europe and America have paid but scant attention to the best measures for preventing diseases, and for preserving health among the masses. The poor, and the destitute, and the degraded, have been too long allowed to remain in their ignorance, to grovel in their filth, and while suffering acutely themselves, to spread around them the contamination and contagion of the diseases of body and of mind, which inevitably result from their neglected condition. The philanthropic few have, from time to time, remonstrated: they have also recommended, and as far as their limited efforts would allow, have carried out improvements; but the former have never obtained a full public hearing, and the latter were too partial in their nature to prune, still less to eradicate, the wide-spread and constantly growing evils. The Plague of Asia and Africa, the Yellow Fever of America, the Typhus Fever in Europe, and the Cholera in all quarters of the world, have spread fright and death, have elicited many legislative and municipal enact-

ments, and given rise to acts of heroic devotion for the relief of suffering and humanity ; but until a recent period they have failed, notwithstanding their frequent and dreaded visits, to fix the attention of the several communities, among which they have been most rife, on their real, and as far as could be ascertained, their preventible causes. It is under these circumstances that Hygeia may be invoked, not merely as the handmaid of Medicine, but as the potent divinity saving her tens of thousands of lives, while the latter can only hope to rescue her hundreds, after incredible efforts and expense on the part of her immediate votaries.

Concurrently with the increase, and both as an effect, and, in turn, a cause of commerce, have been the vast extension and multiplication of manufactures within the past century, and the concentration of human beings, in consequence, far beyond what would be allowable on any principle of hygiene. Deprived, as so many tens of thousands are, in the great manufacturing cities and towns of Great Britain and France, of the common air and common light, pent up in close and damp, often underground lodgings by night, and forced to extraordinary and yet partial bodily efforts by day, receiving an inadequate supply of food, and tempted by their overpowering feelings of exhaustion and depression to seek for temporary renovation and excitement in the use of ardent spirits, or fermented and drugged, erst called malt liquors, what wonder that they are invaded by disease in every shape—fevers, pulmonary consumption, scrofula, and all that can disfigure and deform ? The picture is a gloomy one, and suggestive of fearful forebodings ; it has long enlisted the sympathies of the benevolent, and has at last startled the selfish and the avaricious, who feel a well-grounded alarm at the probability of the continued sufferings and degradation of a neglected, if not despised, class of their fellow-beings diminishing their own gains. But we must not scrutinize

motives too closely, if the acts be of an ameliorating and kindly nature. Enlightened public spirit is urging those who have the power, to make the requisite reforms, and in legislative enactments, as well as in voluntary associations and individual liberality, satisfactory proofs are given of a new and better state of things. Recurrence will soon be made to this subject. In some of the towns of England, of late years, public baths have been opened, and public wash-houses erected, so as to insure to the poorer classes cleanliness of person and clothing, two great means of preserving health, and, indirectly, of aiding the cause of morals; the mind receiving from the body's purity a secret sympathetic aid.

The burden of sanitary legislation is protection of the public health, compatibly with the rights of person and property, and the pursuits of industry. The common right of all is entire enjoyment of the material conditions for healthy life. This right is seldom obtained in its full latitude. It is too often neglected by those who might, with care, enjoy it; and, still oftener, it is withheld or violated by force or selfishness in such a way that the people in mass find it difficult to obtain justice. The contest between cupidity and sanitary rights is sometimes unavoidable, but more frequently it arises from the ignorance on the part of the opponents of reform. So soon as people are congregated in cities and other marts of business, they discover, on coming to a common understanding, the necessity of giving up the indulgence of individual will when it conflicts with the public good. Hence municipal laws for regulating thoroughfare, and for the introduction and export of various articles of commerce, especially the products of agriculture. Every citizen is insured the right of way through all the streets, in the pursuit of business or pleasure; and he is protected by stringent laws from the dishonesty of those who would sell him tainted meat, or provisions at short weight. It is not

in any view of sentimental philanthropy or of ascetic restriction, but in the name of humanity and justice, that so many of our fellow-citizens, in all the walks of life, are urgent for similar prohibitions against the retail trade in liquid poison, the product of alcoholic distillation—the original noxious effects of which on the animal economy are still further increased by the addition of some of the most subtle and active poisons derived from other sources.

Individual caprice and heedlessness are checked in acts which conflict with the rights of the majority, in fact, of the public at large, as when a person would extend the front of his house beyond the regular line, or pile up goods or wares in the middle of the street. It would be well that some limitation should be put also to the height of the house, in order that a whole neighborhood and the passers-by may not be put in jeopardy, or suffer from the loss of limb and life itself by the fall of these lofty structures, which are neither dedicated to religion nor to any public use, but which seem to be merely monuments of the silly vanity of individuals. The exclusion of the cheerful and genial sunlight from the street, and the restricted ventilation produced by such lofty piles, might count for something, even though questions of this nature do not enter into the calculations of cost and profit by the first owners. Paving and draining and sewerage are also recognized parts of city police and sanitary legislation, to which all holders of property are made to contribute, for the public good as well as for their own personal benefit. Public convenience and public health are subserved by these means, the performance of which is insured by regularly appointed agents, and boards of health. Few will be found in the large cities of Europe and America to contest the propriety and wisdom of all these measures of public hygiene, to which must be added the procuring a suitable supply of pure water, although, in many smaller places, they may be, at first, thought to be un-

called for, and to involve an expenditure of money beyond the good to be obtained. It is seldom, however, that experience does not show the groundless nature of these objections, both in a sanitary and economical point of view. There are not wanting, indeed, persons in every country, Christian or Mohammedan, who claim, as one of their reserved rights, the privilege of having their senses of sight and smell assailed by emanations from all kinds of offal and garbage, and the stagnant water of gutters, as if to mark the difference between town and country, and, at the same time, their freedom from restrictive laws. There are also not a few who, with tastes akin to those of the preceding class, claim that their house is their castle, and that they have a right to exclude the air from it as carefully as if they were in a state of siege, and had been obliged to close every aperture through which an enemy's missile might find entrance.

Community of Interests.—State policy, itself, however little affinity it may seem to have to philanthropy and philosophy, is deeply concerned in the inculcation and enforcement of the true principles of public hygiene. The power of a state depends on the population, wealth, and productive industry, and on the cultivated intelligence of its people; trammels on all of which are created by whatever deteriorates the physical strength and the health of any portion of them. Permanent injury to the public health exerts, at the same time, an unfavorable influence on the social state; and hence poverty, with its frequent concomitants of hunger and the daily alternations of eager expectation of relief and of depression of the feelings, has ever been a promoter of secret and political disorganization. While philanthropy incites to more extended efforts for the relief and prevention of sufferings which are the result of a breach of the natural laws or those of health, expanded philosophy teaches that, although some classes in every city pay the heaviest penalties, yet there is no one class ex-

empt from similar inflictions. The rich man, in his spacious mansion, has a direct personal interest in the health and domestic comfort of his poor neighbor ; and the more secluded and shut out from the world, in a dark court or alley, is this neighbor, the greater is this interest. His open windows will give entrance, not only to the refreshing breeze, but also to the poisoned air emanating from congregated beings in the confined lodgings, and from the unremoved refuse or offal adjacent. It is thus that Typhus Fever, beginning in the hovels of the poor, finds its way into the luxurious abodes of the rich. Were it necessary to continue in this line of argument, we might point to the importance of sanitary legislation for the employer or master manufacturer, as well as for the operatives and workmen. His real interest will not consist in obtaining from them the greatest possible amount of work from day to day, without reference to their having a due proportion of time for sleep, and of moderate recreation in the open air. Nor will it be good economy to stint these persons in the quantity of wholesome food which is necessary not merely to remove the cravings of hunger, but to renovate the body weakened by labor. The landlord who desires to have his houses always occupied by good paying tenants, will not be negligent of either their health or their morals. He will not speculate on the powers of endurance of human beings, when deprived of fresh air by residence in close, damp, and badly-ventilated rooms, and who are compelled to inhale an impure and vitiated air, the product of their own respiration, and the exhalations from the accumulated filth of cess-pools, and of yards choked up by offal. The inmates of such habitations are, necessarily, less fitted for labor and active employment of every kind ; lose more time by sickness, and are carried off in larger proportion by death than those in more favorable hygienic conditions. Their nervous system is weakened in the functions of the senses and of the brain ; and, even if in-

temperance should not add its baneful influence to their distress, they are more susceptible to the causes of moral disorders and the temptations to evil doing. Men, thus wearied and worn, depressed in body and in mind, and deprived of all the genial excitement from fresh air and light, and shut out from all the objects which might remind them of nature, under her more pleasing aspects, become careless of themselves, indifferent to the wants of their families, and regardless of the obligations contracted with employer and landlord, or with the administrators of the laws. They are unfitted for prolonged and regular labor. They are bad workmen, bad tenants, and unsafe neighbors. We shall conclude what is to be said of the benefits of a good sanitary system, both to the rich and the poor, by repeating that right royal sentiment of Prince Albert, on the occasion of his taking the chair at a meeting of the "Society for improving the Condition of the Working Classes." "Depend upon it," said the princely chairman, "that the interests of the often-contrasted classes are identical, and it is only ignorance which prevents their uniting to the advantage of each other."

Paving.—The sanitary reforms which have been carried out within the last ten or fifteen years in Great Britain, and those which are still in progress, following as they do a careful investigation of the evils and abuses to be corrected, enable us to speak with additional confidence of the importance and economy of sanitary measures to cities, and to adduce a large body of facts alike pertinent and convincing. Your reporter will content himself with introducing at this time some statements taken from a mass of evidence which he had previously collected for other purposes. To begin with *paving*, it might be sufficient to say that the evils from neglect of it are pointed out in most of the reports on the health of towns, but we cannot forbear from again adverting to the effects witnessed in London. Before the streets of that

metropolis were paved, the inhabitants were as great sufferers from periodical fevers as those of the worst situated rural districts in our own country, and until underground drainage had been adopted to some extent, dysentery was common and largely fatal. Drawing on home experience, it has been found that in Philadelphia, the exemption of the inhabitants from intermittent and bilious remittent fevers has, with great uniformity, followed the paving of the streets. The space now called Dock street was, in the early days of the history of Philadelphia, a miry swamp, traversed by the sluggish stream Dock creek, on either side of which periodical fevers, of all grades, prevailed with a violence equal to those met with in the most sickly districts in distant States. The exposed surface having been paved, and the creek partly filled up and covered over, and made the line of a great culvert, no person residing there now has any apprehension of fevers, such as those that affected the former dwellers there. A like change from the operation of a similar cause has been wrought in the districts of Southwark, Kensington, and Richmond. The change in the sanitary condition of Southwark is the more obviously due to paving and subsequent attention to scavenging, as the greater part of the drainage is on the surface, owing to the limited extent of sewers.

An important lesson is deduced from the history of the foundation of new cities, or the extension of the streets of old ones, viz.: that paving ought to precede the erection of houses, and drainage follow habitation at a very early period. A neglect of these two preliminary conditions for public health has been productive, in all ages, of a fearful waste of life; we say waste, because the deaths were readily preventable. Actually at this time the pavement of the seventy miles of streets in Boston furnishes a cheap protection to the inhabitants against the evils arising out of the constant presence and accumulation of town mud and filth, and other

abominations which it would be impossible to remove from any ground not coated in this way. This is the more evident when we learn that for the length of seventy miles of streets, there are but twenty-five miles of sewers, many of which were some years ago one third to one half filled with mud. Baltimore is mainly indebted to street pavement for the drainage which is done at the surface, as the aggregate length of all the sewers ten years ago did not exceed two miles. One of the most remarkable examples of the beneficial change in the health of a city produced by paving its streets, is furnished in the history of Louisville, Kentucky, which from being called the grave-yard of the West, is now regarded as one of the most healthy cities of that extensive region. Intermittent fever was, as we learn from Dr. L. P. Yandell, a regular annual visitor, and occasionally a form of bilious fever prevailed, rivaling Yellow Fever in malignity, and threatening to depopulate the town. The citizens, awakened, after the fever of 1822, to a sense of their condition and to the means of mending it, set about a system of improvement, the chief feature of which was paving of the streets and filling up of the ponds. The change in the sanitary character of Louisville is the more noticeable, as it was brought about without the aid of subsoil drainage by sewers.

It has been truly said that fever loves the banks of rivers, the borders of marshes, the edges of stagnant pools ; it makes itself at home in the neighborhood of cess-pools and badly constructed drains, and takes especial delight in the incense of gully-holes. It should be added at the same time, that fever, at least of the periodical kind, will be prevented from showing itself by its favorite haunts being covered with a good pavement, so as to separate at once and permanently from the sun and air, the bed of moist putrefactive materials which ferment and give rise to the continual evolution of noxious gases. But the guardians of the public health must not relax

their vigilance after the construction of suitable street pavements, for, unless there be enforcement of a regular system of scavenging, their surface will soon be covered with semi-fluid mud, and offal, and vegetable and animal refuse, which will represent too faithfully and fatally the banks of rivers, a marsh, or the edge of ponds, and the contents of cess-pools and gullies.

Cleansing of the Streets.—Cleansing of the streets, by a proper system of scavenging, is called for, both by the requirements of health and of comfort. The streets have been said, with justice, to be the reservoirs whence we are supplied with fresh air, and if it be impure in them, it is impure everywhere. It is not enough to prevent the access of foul air from untrapped and unwashed drains, but also from surface filth, and the remains of any kind accumulated in the streets. Further, continues the writer who makes these remarks, Mr. P. H. Holland, of Manchester, dirty streets cause dirty houses, dirty clothes, dirty persons; every one walking in them in wet weather carries into his house some portion of dirt, to increase the difficulty of domestic cleanliness. In dry weather the same effect is perhaps more powerfully produced by constant clouds of dust.

Economy of Street Cleaning.—The great obstacle to increased cleanliness of the streets, is the expense of frequent scavenging. Mechanical ingenuity has, within a few years past, obviated, in a considerable degree, this objection. Mr. Whitworth, the celebrated mechanic of Manchester, has perfected a sweeping machine, by means of which he is enabled to sweep the streets of that town three times as often as they used to be by hand, and at the same cost. In Birmingham, Leeds, London, and several other places, this machine has likewise been worked with success. In Liverpool, from some unexplained cause, it has not given equal satisfaction—

The expense of cleaning the streets and ash-bins, &c., is balanced by the sale of ashes and dust by the parishes of London. The experience of Edinburgh shows that, under proper officers, the daily cleaning of the city, and of its numerous courts and closes, is attainable at the moderate expense of ten thousand dollars a year. In Aberdeen, the work is done daily, at a profit to the city of a sum equal to three thousand dollars. In Hull, they have discovered that they can readily dispose of to small farmers—who find it their interest to collect it—the refuse from the houses, even in the courts and alleys, which are inaccessible to carts. Small streets, as well as courts and alleys, are apt to be neglected by the scavengers, and if any of these be unpaved, stagnant puddles are the consequence, and the atmosphere, necessarily close and confined in such spots, becomes still further deteriorated by the accumulations of refuse and filth, not to speak of the presence of open privies.

Sewered and Unsewered Districts compared.—In contrasting the effects on the health of the inhabitants of *sewered* with *unsewered* districts in the same town, we are met by the remarkable example of Ashton-under-Lyne in England, in which the duration of life is six years more in the former than in the latter portions. Equally marked results have been obtained from the sanitary records of Chorlton, a township of Manchester. While the mortality in the undrained streets amounts to four per cent., in the drained districts it is only two per cent.; and that we do not overrate the influence of drainage, is proved by the fact that some streets containing 3500 inhabitants, and exhibiting a mortality of 1 in 32 of the population, were elevated immediately after having obtained the benefit of sewerage to such a scale of health, that the deaths decreased to 1 in 50, or in other words, the deaths were diminished 20 a year out of every 110, even as a first effect of putting the streets in a proper condition as to sewer-

age. Other districts of Manchester give the same instructive lesson. In Liverpool it was ascertained that although the high mortality of 5.4 per cent. occurred in both sets of courts in that city, yet that more than 22 persons in every 100 of the undrained courts had serious cases of illness, while only 10 in 100 suffered in the same way in the drained districts. The sanitary history of every city contains evidence of the improvement of the public health following a good system of sewerage. Proof is also furnished in the contrast offered between the preferred and fashionable streets as we now find them, and the same spots before they had the benefit of paving and sewerage. In London, the west end of the city, and Westminster, the seats of the residences of the nobility, and where are found the courts of law and the two houses of Parliament, were once extensive marshes, nearly uninhabitable on account of the fevers which annually prevailed there. In Paris a regular system of sewerage has converted sickly and almost abandoned districts into those now known as the Faubourg Montmartre, the Chaussé d'Antin, and the Faubourg St. Honoré, which are remarkable for the business transacted in them, and the wealth of their inhabitants.

Rotherhithe, a district of London, on the south bank of the Thames, has been the favorite haunt of the cholera in successive periods of appearance of that disease from 1831-2 to 1854. Its sewerage was deplorably defective, being by open sewers connected with the river. Malignant cholera spread to a much greater extent on the line of open sewers than in the other poor and densely inhabited places. In other districts, we are told that the line of habitations, badly cleansed and suffering from defective drainage, formed the line of cholera cases in 1831-2. The reports of the medical inspectors, appointed by the Board of Health in London, in 1854, concur in showing that wherever cholera has become localized, it was found to be connected with obvious remov-

able causes. Of these, the principal were the open ditches used in most instances as sewers, or receptacles of all descriptions of filth, and receiving the drainage of numerous privies. Generally speaking, the mortality from cholera was greatest in the lowest levels, owing, as may readily be supposed, to their imperfect drainage, and consequently to the greater humidity and impurity of the air of such places. The advantages that might be expected from greater elevation are lost however, by defective or inefficient drainage, as in the instance of the district of Kensal, in the parish of Chelsea, near London, if not now an integral part of the metropolis. This district, with the advantage of having at least 50 feet higher elevation than the rest of the parish, and an open airy situation, had a death-rate from epidemic disease, principally diarrhoea, nearly double that of any other district in the parish; although if we exclude epidemic disease, it is actually the healthiest of the Chelsea districts. The defective sanitary arrangement, on which this state of things depends, is described by Dr. Barclay, Medical Officer of Health for Chelsea, to be inefficient drainage, fecal fermentation, and the impregnation of the atmosphere with unwholesome emanations from foul drains, ditches, and cess-pools. It has been said that the course of Typhoid Fever in a town may be tracked by that of neglected sewerage. In Croydon, a town not far from London, in consequence of a new but badly constructed system of drainage, there occurred "an alarming outbreak of Fever, (Typhoid), Diarrhoea, and Dysentery." And the relator, Dr. Letheby, adds, that Dr. Carpenter, of that town, informed him "that even now he can tell where the pipes are stopped, by the occurrence of Diarrhoea or Fever in the houses through which the foul gases are forced." Typhoid Fever has been represented to be a better test than even Diarrhoea of the sanitary state of a town.

The unhealthiness of an urban or suburban district, and its

liability to visitations of Fevers and Cholera, depend in no small degree on its low situation and its proximity to river-banks, or to stagnant water, and too commonly still on its imperfect drainage. It was said, in reference to the intimate relations between the activity of the disease, and the proximity of the river Thames, that two causes are at work in such a locality. First, increased humidity, and, secondly, and more especially, the large evaporating surface of foul water, by which noxious effluvia are continually given off, and poison, to a certain extent, the atmosphere through which they are diffused. On this point, the language held by Dr. Grainger, will properly find a place on the present occasion: "It is almost needless to point out," writes this gentleman, "that when the numerous sewers of a city reach the stream, one part of their contents widely mingling with a large body of water, undergoes solution, and thus presents a physical condition favorable to their subsequent escape into the atmosphere in the form of mephitic gases; whilst other portions, owing to the diminished velocity, sink to the bottom, near the edge of the river, and thus become deposited on the banks of putrid mud, which will at the next tide, being laid bare to the action of the sun and air, exhale poisonous effluvia." This writer adds, that some facts came to his knowledge, showing that it is precisely in those spots at the stream, which receive the principal body of sewerage, that Cholera especially ravages the population. We may add that it was so at Hamburg and at Berlin, in the latter of which cities open drains emptying their contents into the sluggish Spree, would be productive of still greater mischief. In Paris, the evils from this cause have been felt, and suggestions were made some years ago, and have been in a measure carried out, to construct two great tunnel sewers, one on each side of the Seine, to receive and transmit to some distance below the city all the sewerage of the different branch-sewers. A similar project is now discussed in London, so

that the Thames may cease to be, as it has been for a long time past, the great common and open sewer of the metropolis. In Philadelphia and New York, reforms are called for in this matter, so that the mouths of the sewers, which discharge their contents into the rivers of these two cities, shall not be exposed at low tide, and give out poisonous effluvia, which either directly generate malignant Fevers, or serve as exciting causes on organisms predisposed by atmospherical extremes, such as high heat and humidity. Without involving ourselves in doctrinal questions as to the origin of Yellow Fever, we are sure of receiving, from all quarters, the admission of the general sameness of the localities of this disease, and that these are distinguished by their consisting, for the most part, of alluvial and made soil, and by their being deficient in suitable drainage and analogous means of preserving the surface dry and clear of accumulations of filth and the like decomposed organic remains. What is said of the Yellow Fever in New Orleans will apply to other places in which it has committed its worst ravages, viz., that it attacks, generally, at first, the most susceptible, who live in the filthiest, worst-drained and paved, and worst-ventilated, and most crowded portions of the city. In Philadelphia, invariably from the first visitation of the Yellow Fever in 1699, to the last slight one in 1853, the history of the origin of the first appearance of the Fever is told in nearly the same language, viz., in Dock street, near the draw-bridge, the former mouth of Dock Creek, in different parts of Water street, or at the water-side, or on one of the wharves, between Kensington on the north, and Southwark on the south end of the city. In 1699 it broke out in the vicinity of the dock at the end of Spruce street; and in 1853 on or near the wharf at the Delaware corner of South street—the two spots being less than three hundred yards apart. Near the latter of the two, the mouth of a large sewer was exposed at low tide, and the emanations from its imperfectly discharged contents left to

poison the air around. In New York, a still worse state of things prevails, not only from the same cause, but from the slips and docks, especially on the East River, being made the receptacles for all kinds of offal and refuse, thrown into them from the wharves and the vessels.

SEWAGE AND SEWER GASES.—The virulent and actively poisonous nature of the emanations from sewage, whether at the terminations of the sewers left exposed in the manner now described, or in the course of its passage under the streets of a city, from gully-holes or leaks in the public sewers, as well as in the private drains leading into these latter, have been investigated with considerable care of late years both in London and Paris. In the British metropolis, Drs. Barker and Letheby, the first in a paper in the *Sanitary Review and Journal of Public Health*, Vol. IV., the second in a *Report to the Commissioners of Sewers of the City of London*, have entered very fully and ably into the subject. Dr. Barker instituted a number of experiments on animals, with a view of showing the toxical effects of the chief gases in sewer emanations, viz., carbonic acid, sulphuretted hydrogen, and ammonia, or rather sulphide of ammonium. A mouse, exposed in a cage to the air of a cess-pool, within three inches of the surface, although it was well fed at intervals, died on the fifth day. Dogs thus exposed suffered from vomiting, diarrhoea, and febrile symptoms, rigors, restlessness, thirst, and loss of appetite. The gases above named were then experimented with separately. A puppy, exposed to less than two per cent. of sulphuretted hydrogen in the common air, was destroyed in two minutes and a half, without a struggle, and so small a proportion as 0.428 per cent. killed another in an hour. A dog, exposed to 0.205 per cent. of this gas, was affected within a minute by tremors, and fell on his side. The action of the heart became irregular, and within four

minutes the respiration had apparently ceased, but after awhile was renewed. After one hour and thirty-eight minutes the dog was removed from the box containing air mixed with sulphuretted hydrogen as above. The respirations, which had, previously, at one time—three quarters of an hour from the beginning of the experiment—been 112 and even 120 in a minute, became suddenly stertorous, as in apoplexy. On the removal of the dog the respirations were stertorous, the limbs rigid, and the head was drawn backwards: the animal died nine hours and thirty-eight minutes after the commencement of the experiment. A second dog, similarly exposed, suffered at first, but soon revived, and at the end of five hours, was removed without exhibiting any morbid effect. Another was attacked with tremblings and diarrhoea after breathing the gas; a fourth with all the appearances of intoxication. Ammonia and its salts produced what Dr. Richardson, in his *Essay on the Causes and Coagulation of the Blood*, considers to be unmistakably typhoid symptoms. The minute quantity of 0.056 per cent. or 56 parts of sulphuretted hydrogen in a thousand of common air, is sufficient to produce serious symptoms—eructations, tremors, rapid and irregular respiration, extraordinary rapidity of the pulse, and diarrhoea. The inhalation of carbonic acid in small proportions was followed by diarrhoea. Dr. Barker arrived at the following conclusions, which may be received as a fair expression of the facts:

“The symptoms which have been noticed as resulting from the inhalation of sulphuretted hydrogen, sulphide of ammonium, and carbonic acid, are sufficient to account for the effects arising from cess-pool effluvia, without seeking for any further product from such emanations. Comparing the experiments with cess-pool air with those in which separate gases were employed, the inference seems clear to my mind, that the symptoms arising from the inhalation of cess-pool atmo-

sphere were due mainly to the presence of a small amount of sulphuretted hydrogen, which gas was always present. If the experiments with the cess-pool air be placed side by side with those in which sulphuretted hydrogen, in the proportion of 0.056 per cent. was administered by inhalation, the analogy between the two sets of results will be sufficiently unmistakable."

Before inquiring into the nature, and the effects on the animal economy of sewage gases, Dr. Letheby examines the *nature of sewage* itself—as far as observed by this writer, in reference to what is met with in England. The matters to be dealt with in the public sewers of every town and city are very complex, for they are composed not only of the solid and liquid ejecta of the population, but also of the fluid refuse of every branch of industry. They consist of the filth of kitchens, laundries, and dye-houses; the drainings from stables, slaughter-houses, and the public markets; the various liquid impurities of trade and manufactories; and the washings of the streets and alleys; all of which, with the ejecta of the inhabitants and a large quantity of water, compose the sewage of towns. In Paris and the French towns generally, and in our American ones, a difference prevails in their sewage from that of London and other towns in England, in the circumstance of the small quantity of human ejecta which is conveyed by private sewers into the public ones in France and the United States. Altogether, it may be said, that the ejecta of the inhabitants of London and the washings of the streets daily, furnish about 233 tons of solid matter to the sewage, of which 152.6 tons are of dry matter, and 293.6 of moist, and these with the trade refuse, are diluted with about 84½ million gallons of water. It has been estimated, as data for part of the preceding calculations, that 2 to 2½ ounces of dry solid matter are contained in the excrements *per diem* of each member of the population. Another mode of estimat-

ing the composition of sewerage is founded on the analytical results of its examination at different times and places. These show that the sewage discharge by day is richer in solid material than the night sewage is; and that there are considerable differences in this respect between the contents of sewers situated in different quarters of the city. "Taking the average of all the results obtained in the examination of the metropolitan sewers, it may be concluded that the sewage which flows into the Thames contains about $90\frac{1}{2}$ grains of solid matter in the gallon; of which about $29\frac{1}{2}$ are suspended, and $60\frac{1}{2}$ dissolved: there being about 15 grains of organic matter in each of these constituents." "The mineral constituents of sewer-water are chiefly carbonate of lime and common salt, with small proportions of the alkaline sulphates and phosphates. They are derived from urine and from the water supply. The mineral part of the insoluble matter consists almost entirely of the *debris* of the streets, and detritus of wheels and horse-shoes. Their amount is about 15 grains per gallon; which, in the aggregate, is as near as possible 81 tons per day for the whole of the metropolis, or 19 for the city." "Then, of the total amount of 485.5 tons of solid matter contained in the sewage of one day, about 152.60 tons are the ejecta of the inhabitants; 81.08 tons the pulverized granite and iron on the roads; 102.04 the saline matter contained in the water supply; and the residue, 152.78 tons, is from trade and manufactures. The total amount of organic matter in all this is about 215.14 tons; of which half is in a state of solution, and the rest is suspended.

"The physical properties of the sewage are peculiar, for when it is examined under the microscope, it is found that the clear supernatant part contains a large quantity of amorphous organic matter, with the filaments of various fungi. It swarms with animal life, as beaded *spirulina*, *vibriones*, and

monads ; and soon after exposure to air the higher forms of infusoria appear, as *paramecium*, *vorticella*, *rotifera*, &c. Besides which it contains small particles of animal and vegetable tissues, as the fibres of cotton, wool, &c." "The mineral part is composed of the *débris* of the streets, as particles of granite, flint, and carbonate of lime, with a large quantity of the black sulphuret of iron. When the sewage has a very unpleasant odor, and is charged with sulphureted hydrogen, it never exhibits much sign of animal or vegetable life, notwithstanding that it contains an abundance of decaying organic matter. This is the case with the foul contents of the nearly stagnant sewers."

The putrefactive decomposition of sewage is noticed by Dr. Letheby. Looking at the enormous quantity of organic matters contained in sewage, and its minute subdivision, proportion of water, and temperature, it is not surprising that its decomposition should be attended with the evolution of a large amount of noxious gas, or that it should at once take on the putrefactive change, and begin to evolve foul gases, before it enters the sewers. "Under ordinary circumstances, the solid excrements do not ferment in less than three or four days, but here the catalytic influences are so strong, that putrefaction begins at once, and it is always of the same kind as that already in progress in the old sewer matter. This tendency to accelerate and direct the decomposition is very remarkable. Its power lasts for weeks after the sewage has ceased to ferment, or it will operate immediately in all kinds of organic substances. Blood, sugar, feces, urine, and other fermentable bodies are rapidly changed by it; and they evolve compounds of a most offensive character. Common sugar, instead of being fermented into alcohol, is converted into lactic acid, which smells like putrid pig's-wash; then it passes into butyric acid, and gives hydrogen and carbonic acid, with the odor of rancid butter and human perspiration."

Dr. Letheby points out the important part which the oxygen of the atmospheric air performs in the sewers, by giving birth to mineral products, as water, carbonic acid, the sulphates, phosphates, and nitrates, which are the final products of decay. "Its influence, therefore, is most salutary, and ought not to be disregarded. Experiment has also shown that the oxydizing power of the air is promoted by water, by porous substances, and by the fixed alkalies." Dr. L. ascertained that it is the solid part of the sewerage which continues to ferment and keep up the putrefactive action for months, evolving large quantities of ammonia, sulphuretted hydrogen, marsh gas, and carbonic acid. It is the sedimentary matter which is the chief cause of the effluvium, and to this the writer afterwards directs attention.

The Nature of the Sewer Gases.—Dr. Letheby judiciously precedes his observations on this subject by the observation, that little can be really done in the way of providing a remedy for the sewer miasms, until something is definitely known of their nature and composition. He has endeavored to procure the knowledge wanted, by three sets of investigations, viz.: "1. From inquiries into the composition of the gases dissolved in sewage; 2. From an analysis of the gases evolved during its putrefaction; and 3. From an examination of the sewer air itself." The clear liquid of sewage, when heated, evolves all the gases which were held in solution. These consist of carbonic acid, sulphuretted hydrogen, ammonia, marsh gas (carburetted hydrogen), and nitrogen. Their quantity varies from about 32 to 76 cubic inches per gallon; and the proportion of carbonic acid varies from 36 to 72 per cent.; the sulphuretted hydrogen from 0.9 to 3.1. A fact, full of significance, in relation to the condition of that river in its course through London, is stated here. It is, that Thames water, near to the shore at low tide, contains the same

gases in nearly the same proportion. It was observed that these gases are abundantly evolved wherever the sewerage becomes stagnant, or nearly so. From the thick slushy matter in one sewer (that of Catharine-wheel alley) the carburetted hydrogen, among other gases, bubbled up in such quantities that it could be ignited with ease, and would thus set fire to the neighboring bubbles and produce a sheet of flame that would extend for some distance along the surface of the sewage. "The gas contained 68 per cent. of inflammable air; 17.6 of carbonic acid; 14.1 of nitrogen, and 0.2 of sulphuretted hydrogen. The amount of ammonia contained in the liquid of sewage is also considerable. It ranges from 3 to 15 grains in the gallon of ordinary sewage, and from 15 to 41 in that of nearly stagnant sewers. In addition to all these, there are other volatile compounds which have not yet been isolated—compounds which give to the sewage its peculiar odor, and which Dr. Letheby surmises may also cause its poisonous action. Looking at the experiments of Dr. Baker, previously noticed, we may doubt the necessity of searching for other and unknown toxical agents to give rise to morbid phenomena which are already strictly ascribable to known gases. The English writer made experiments similar to those performed thirty years ago in Paris by Gaultier de Claubry, which show the great diminution of oxygen, the increase of nitrogen, and the evolution of sulphuretted hydrogen in sewer air. He was able to condense the organic vapor which rose from the sewer air, as had been done by the French commissioner appointed to report on the cleaning and purifying of the public sewers of Paris, at the time just mentioned, and of which Parent-Duchatelet was a member. The liquid thus obtained had a very disagreeable and putrid and ammoniacal odor, like that of bad sewage.

On the subject of the *properties of the sewage gases and their effects on the animal system*, we gather some interesting

facts from Dr. Letheby's Report. He begins with sulphuretted hydrogen, which experiments, performed many years ago by Dupuytren and Thenard, show to be eminently poisonous, even in very minute quantities. Horses are killed by an atmosphere containing one part of it in 250 of the air; but much less is hurtful if it be breathed for any length of time. It is on record, that the men who were engaged in cutting through the bed of the river, for the construction of the Thames tunnel, suffered severely from the effects of the gas, although the proportion of it in the air was hardly to be discovered by lead paper, and could not, therefore, have exceeded one part in 100,000. It is true that it sometimes came in gushes from the fissures of the mud, but the quantity was rarely sufficient to be recognizable by its odor. Strong and robust men were, however, reduced to a state of extreme exhaustion by breathing it for a few months, and several of them died from this cause. The symptoms with which they were affected were giddiness, nausea or actual sickness of stomach, and great debility. The men became emaciated, lost their appetites, and fell into a state of low fever, from which, in several instances, they did not recover. Chloride of lime and other prophylactics were used, but the evil did not entirely cease until the tunnel was opened from end to end, and free ventilation established. Dr. Taylor mentions another remarkable instance of the same kind of poisoning, which occurred in the summer of 1857, at Clayton Moor, near Whitehaven, where there is a row of small cottages built on the refuse slag of some neighboring iron furnaces. In the course of two days, in the month of June, thirty of the inhabitants, all of whom had been for some time previously annoyed by an offensive smell, were made seriously ill by it. In a family of seven persons, consisting of a husband and wife, and five children, who had retired to rest in their usual health, two were found dead the next morning, and the others were in a

state of insensibility. "Before the day was over, another of them died, and in the course of the week a fourth. In the second case, a strong, healthy man came home from his night-work, and went to bed; but an hour had hardly elapsed when he also was found dead. And in a sixth instance, a child was taken ill in the morning and was a corpse at night." In an inquiry instituted on the occasion, in order to discover the cause of the mischief, Dr. Taylor came to the conclusion that it was the sulphuretted hydrogen, generated by the action of water on the refuse slag upon which the houses were built. If the explanation be a correct one, the case is a remarkable instance of the poisonous action of this gas, for the test of lead paper failed to show the presence of the poison except in mere traces, that is, in quantities which could not have been greater than one part in 100,000 of the air. "These experiments and observations show that sulphuretted hydrogen gas is a powerful narcotic poison; that in a concentrated state it kills immediately, as with the energy of prussic acid. In a more dilute form, it causes death by lingering stupor, and when more diluted still, so as hardly to be discovered by the odor, it prostrates the vital powers, and produces a low fever, which may end fatally."

"*Carbonic acid* is also produced by the decay of organic matters. It is found in the air of sewers to the extent of 0.5 to 2.3 per cent., and the gases evolved from the sewage itself contain about 19 per cent. of it. If the gas has been produced at the expense of the oxygen of the air, as happens in sewers and crowded rooms, the effects are more strongly marked, for under these circumstances as little as three per cent. will quickly destroy life, and even the proportion of from 1.5 to 2 per cent. will cause almost immediate distress and feelings of suffocation, with often giddiness and headache, and a sense of weight and throbbing of the temples. This is sometimes followed by a slight delirium, and then by an irresistible desire to sleep, the stupor of which passes slowly into coma."

Ammonia is another constituent of the sewer air, and is a product of putrefaction. It is known by its peculiar odor and alkaline reaction. It is lighter than the common air in the proportion of 590 to 1000. "When ammonia is inhaled in a concentrated state, it produces immediate asphyxia; when it is somewhat diluted with air, its action is chiefly on the lungs; and when it is more diluted still, and is breathed for a considerable time, it liquefies the corpuscles of the blood, and produces the symptoms of typhoid fever." These observations are confirmed by Dr. Barker's experiments. Dr. Richardson, already quoted, in the same sense, finds, from experiment, that the continued action of ammoniacal gas, even when it is largely diluted with air, is peculiarly injurious to the animal economy: the tongue becomes dry and dark, there is an involuntary action of the muscles, varying from mere twitching to violent convulsions; there are insensibility, extreme sensitiveness to sound, obscurity of sight, and ultimately, if matters are pushed far enough, death by coma. The state of the organs after death tends to the same conclusion. The blood is dark and fluid; the serous membranes show petechial spots, and the tissues are softened. "But," adds Dr. Letheby, "there is another property of ammonia which is more dangerous still: it is that of conveying the less volatile products of putrefaction into the air. In all probability it is the purveyor of the miasms of infected districts, as it is known to have the fetid compounds of animal and vegetable decomposition. It was the agent which gave validity to the putridities of the Thames during the hot weather, and it is the medium by which the more offensive matters of coal gas are held in suspension. Nor is it less powerful by diffusing the sweet odors of plants and the subtle constituents of many perfumes. It may, therefore, act for good as well as for evil.

"*The volatile compounds of ammonia, with carbonic acid*

and sulphuretted hydrogen, are also injurious. The first act like the alkali itself, and the second like sulphuretted hydrogen. I have found that one part of hyposulphate of ammonia in 1000 of air will kill birds almost instantly, and one in 500 will kill rabbits."

"*Light carburetted hydrogen*, or *marsh gas*, is also found in the atmosphere of sewers, but it rarely occurs in such proportion as to be dangerous; now and then, however, it accumulates, as it does in coal mines, and becomes explosive." Miners are often obliged to work in an atmosphere containing from 8 to 10 per cent. of the gas, but they experience no ill effects from it, until the proportion rises to about 20 per cent., and then they feel giddy, with a sense of weight upon the forehead

"*Coal gas* is likewise present in the sewers; it is not found there, but escapes from the street mains. The quantity which is let loose in this manner is enormous. Gas consumers say that from 12 to 35 per cent. of all the gas manufactured in London is lost. Now supposing that of this, the leakage amounts to five per cent., which my friend, Mr. Wright, informs me is about the quantity, then as much as 386,400,000 cubic feet of gas escape into the public ways of the metropolis every year, or rather more than a million cubic feet every day; and in the city it amounts to about 25,000,000 cubic feet *per annum*, or nearly 70,000 cubic feet per day. Most of this must find its way into the sewers, and therefore is a matter of some importance. The chief constituents of coal gas are hydrogen, and light carburetted hydrogen. The former amounts to about 40 per cent. of the gas, and the latter to 45. The other constituents are about 7 per cent. of carbonic oxide, 2 of nitrogen, 1 of carbonic acid, and 5 of the condensable hydrocarbons, besides which, there are always traces of ammonia, bisulphuret of carbon, and coal tar. The principal danger from this gas is its inflammability, and its

property of forming an explosive mixture with atmospheric air." "Dr. Taylor has attested the record of seven cases of death from the action of coal gas, and it is probable that the air was not charged with more than 8 or 9 per cent. of it in any one of them."

Dr. Letheby cannot speak with certainty of the *organic* vapor which is contained in sewer gases, "except that it is a matter in a state of active decomposition; and experience has long since decided that matter in this condition has power to disturb the equilibrium of other organic molecules, and to propagate to them its own state of decay. When this occurs in the living animal body, it is productive of the most terrible consequences. Our ignorance of the nature of this organic vapor is not surprising, when we consider that we are equally uninformed of the composition of the subtle miasms and putridities which abound in the air of infected districts, and in the vapors of organic decomposition." "Sometimes these miasms are colorless, but in the case of the sewer gases, it is the organic vapor which gives them their peculiar smell, for when the sulphuretted hydrogen is entirely removed, there are still the characteristic stinks which have been so accurately described by Parent-Duchatelet."

What are the dangers of the Complex Sewer Gases themselves? Experience has shown that they are of two kinds, namely: the dangers which are incidental to the poisonous action of the gases; and those which arise from their explosive property." Observation has proved that these gases are among the most active poisons. Passing over a description of the acute forms of poisoning by them when inhaled in their undiluted state, it may be stated, as most germane to the present inquiry, that when these gases are much diluted with atmospheric air, they produce a general prostration of the vital powers. "The appetite fails; the bowels become disturbed; diarrhoea of a chronic character sets in:

and the sufferer is either worn out by exhaustion, or he falls into a state of low fever, from which it is difficult to raise him."

Dr. Letheby gives additional point to this part of the subject by mentioning a few cases of chronic poisoning in which the effects were produced by the inhalation of very small quantities of sewer miasm. We cannot forbear from repeating his narrative, under a belief of their extreme appositeness to the immediate purposes of this report, and for the lessons of caution which they furnish. One of the most remarkable instances of this is recorded by M. D'Arcet. He states that there was a small lodging in Paris, consisting of a bed-room and ante-room, which had been successively tenanted by three vigorous young men, each of whom died within a few months of his occupying the place. D'Arcet was requested to examine the rooms, and ascertain the cause of the evil. He found that a pipe from a privy in the upper floor ran down by the side of the wall near to the head of the bed where the inmates slept. The pipe was unsound, and the wall was damp from leakage of the soil into it; but there was no perceptible smell in the room when D'Arcet examined it; nevertheless he had no doubt that the deaths of the former occupants were referable to the emanations from the wall. The pipe was therefore repaired, and from that time the unwholesomeness of the place was cured. Again, in August, 1831, twenty-two boys living at a boarding-school in Clapham, near London, were suddenly seized with alarming symptoms of irritation of the stomach and bowels, with twitchings of the muscles of the arms and excessive prostration of strength. Another boy had been similarly attacked three days before, and he died in twenty-five hours; one of the others died in twenty-three hours. A suspicion of accidental poisoning naturally arose, and the various utensils and articles of food used by the family were examined, but nothing

of a deleterious nature was found. The only circumstance which appeared to explain the accident was, that two days before the first child was taken ill, a foul cess-pool had been opened, and the matter of it diffused over a garden adjoining to the children's play-ground. This was considered to be the cause of the disease, and the opinion was formed not only by the medical attendants, but also by Drs. Latham, Chambers, and Pearson, who personally examined the whole of the particulars. The third instance to which I shall refer is of more recent date, and has been a subject of considerable discussion. In the month of August, 1852, an attempt was made to drain the town of Croydon by means of small stoneware pipes, which were not only of insufficient size, but were imperfectly cemented together. The consequence was, that a large quantity of the sewage escaped into the earth, and drained away to the neighboring ditches. This became a subject of great annoyance, and in a short time it produced an alarming outbreak of Fever, Diarrhoea, and Dysentry. In the report from the Poor Law Commissioners on the sanitary condition of the laboring population of Great Britain, there are many examples of the morbid action of sewer and cess-pool gases. There is one case which is remarkable for its significance. "On the north side of a street in Derby there are fifty-four houses, all of the same description, and inhabited by the same class of persons. Six of these houses in the very centre of the row became the abodes of fever, and of sixteen persons attacked with the disease, five died. The fever was nowhere else in the row, and on inquiry it was found that these, and these only, were exposed to the action of sewer gases, and the miasms from cess-pool matter which had soaked into the soil."

It is impossible to carry the observations and experiments of Drs. Barker and Letheby in our minds without our comprehending the noxious agencies by which obstinate and often fatal diseases of the digestive organs, and low fevers, are pro-

duced in those parts of a town where the inhabitants are continually exposed to the operation of the gases above mentioned. These arise from vegetable and animal matter in decay and decomposition, from obstructed gutters, open drains, or from cess-pools, and the mouths and gully-holes of sewers, and accidental openings in these latter. Even when not directly poisoned by the continued inhalation of a corrupt atmosphere always charged with these gaseous poisons, the people thus exposed acquire such a predisposition—have their vital energies so much reduced—are primed as it were—that a slight change in the ordinary conditions of the atmosphere, or diminution of their accustomed food, serves as a spark to ignite into febrile fire their weakened and susceptible frames.

On the means of remedying the sewer miasms, or of preventing the offensive and toxical effects of the emanations from sewers, we cannot do better than introduce that portion of Dr. Letheby's report, the title of which was furnished in a preceding page. His manner of treating the subject gives it a freshness and value that cannot fail to be acceptable even after the interesting report of Dr. Van Bibber. At any rate, coming directly in our line of practical precept in all that relates to sewerage and sewage, we have not hesitated to apply it to our own purposes.

"THE REMEDY FOR THE SEWER MIASMS.—This is the great question which you have submitted to me for consideration, and the preceding facts show clearly enough that it is an important question. I am far from thinking, with your engineer, that the mischief occasioned by sewer gases is not of such magnitude as to be worth a remedy that may cost sixpence a head to the population; nor do I believe that if you had temporized with the matter, and had yielded to the demand on the part of the public, to close up the ventilating gratings, which are now so offensive, and had thus turned the foul gases into the house-drains, the nuisance would have been regarded simply as a domestic evil, for which the cure

was to be sought privately and individually by those who felt the annoyance; in fact, such a proceeding would have been unworthy of the trust which is reposed in you as the custodians of the public health, for it would have been a matter of life or death to the great bulk of the community.

"At all times attempts have been made to destroy or neutralize the offensive products of decomposition; and the simplest way of doing it has been by the use of another secret—a perfume of volatile oil, which would cover or mask the offensive body. These were the correctives employed in religious worship. They entered into the composition of the ointments of the high priest and the incense of the altar, and to this day they have enjoyed a reputation and general popularity which they have not deserved, for their action is not on the putrid product, but merely on the sense of smell, which they blunt to the action of the offensive vapor. In the middle ages, when the plague, the black death, and sweating sickness, and pestilential fever desolated the cities of Europe, immense importance was attached to the use of perfumes; fumigations, with costly spice and rich-smelling Oriental drugs, were largely used in the houses of the rich, but with no good effect. The ancients also knew the value of fire as a disinfectant; and they also made use of the fumes of burning sulphur.

"But the right knowledge of the action of disinfectants and deodorizers dates from a very recent period, for so late as the year 1773, Guyton Morveau, one of the best chemists of France, thought that the vapors of muriatic acid were the most powerful of disinfectants; and later still, in the year 1803, Dr. Carmichael Smith obtained a grant of £5000 from Parliament, for a suggestion which is nearly valueless, namely, the employment of the fumes of nitrous acid. Chlorine gas was discovered by Scheele in 1774, and soon afterwards its disinfecting properties were noticed by Berthollet, but its use cannot be dated farther back than the present century, when Guyton Morveau and Dupuytren first pointed out the great value of it as a disinfectant; and even then it was not generally employed; in fact, its present popularity dates only from the time that chloride of lime has been largely manufactured for bleaching purposes. Within the last twenty years almost all the refuse

products of the arts, and a great number of special compounds, have been recommended for the deodorization of sewage, &c. They all act in one of two ways; they either give stability to the organic matter, and so check its tendency to decay, or they operate on the putrid vapors, and destroy their offensive properties. This they do, either by fixing the effluvium, and forming compounds which are inert, or by breaking up the putrid molecule and changing its nature, or by expediting the process of decay, and hurrying it on to the last stage of oxydation.

"Those substances which give stability to organic matter are properly called *anti-septics* or *anti-putrescents*. They have always been more popular than any of the second class of deodorizers, because of their importance in the arts. Salt, sugar, vinegar, creosote, and the empyreumatic oils of wood, peat, coal, &c., are examples of this class. So also are chloride of zinc, sulphate of copper, and corrosive sublimate, substances which have been respectively patented by Sir William Burnett, Mr. Margary, and Mr. Kyan. Alum and the astringent matter of many vegetables have likewise been used for ages as the means of preserving gelatinous tissues in the form of leather. None of these, however, except the chloride of zinc, is applicable to the case before us, and that operates more as a deodorizer than an anti-putrescent. In fact, as I have already stated, the matters of sewage are always in a state of decomposition, and cannot, therefore, be treated with much advantage, unless the anti-septics are applied to them before they enter the sewers; and this, I need not say, is altogether impracticable. Even in Paris, where there are special contrivances for such a purpose, it fails, because of its utter impracticability.

"Of the second class of substances, namely, the *deodorizers* and *disinfectants*, there are many which deserve notice.

"Those which combine with the putrid gases and fix them into involatile form, are the metallic oxyds and their salts, as chloride and sulphate of zinc; acetate and nitrate of lead; sulphate, muriate and pyrolignite of iron; impure muriate of manganese; the refuse of bleaching works; common alum; the fixed alkalies; and the salts of lime and magnesia. Most of these compounds unite with sulphuretted hydrogen and ammonia of sewage, and so

far, therefore, they remove the unpleasant smell of it, but they do not touch the organic vapors. Besides which, they are difficult to apply, and are very costly. In fact, putting aside all the working expenses that would attend their use, the mere cost of the deodorizers alone would range from £20,000 to upwards of £1,000,000 per annum for the city sewage, and from £1,000,000 sterling to £48,000,000 for the sewage of the whole of London. This, together with the insufficiency of their power as deodorizers, and the difficulty of applying them while the sewage is within the sewer, deprives them of all practical utility. That power which they possess, namely, the power of coagulating a great part of the soluble matter of sewage, and favoring the precipitation of the insoluble, can only be applied with any chance of success after the sewage has left the sewers; and, even then, there are but two of them, namely, lime and the superphosphate of lime with magnesia, that can be used with advantage.

“Of the second class of disinfectants, those which act chemically on the volatile matter, and break them up, so as to form new compounds, which are inert, the most important are chlorine, chloride of lime, hypochlorous acid, sulphurous acid, and nitrous acid. The first three of these, namely, chlorine and its oxy-compounds, operate by abstracting hydrogen from the putrid vapors, and perhaps, also, by decomposing water, and setting the oxygen free to destroy the miasm. The power is remarkably great, as may be seen by the action of chlorine or chloride of lime on ordinary sewage. Eight grains of chloride of lime, or less than an ounce of the solution of chlorine, will completely deodorize a gallon of sewage; and the diffusion of a little chlorine through the worst kind of sewer gases, is sufficient instantly to deprive them of their offensive odor. Nevertheless chloride of lime is a costly agent. If it be used in the proportion of only eight grains to the gallon, it will cost nearly £57,000 a year for the deodorization of the city sewage, and nearly £287,000 for the sewage of all London. As for the gas itself, it is almost impossible so to apportion and manage the diffusion of it in the sewers as not to have the chlorine or the sewer gases in excess.

“Sulphurous acid and nitrous acid are still less manageable, and

besides that they are costly, and not nearly as powerful in their action as chlorine. Like chlorine, however, they disorganize the putrid molecules and decompose the hydrosulphuric compounds, and fix ammonia; but like it also they are powerful irritants, and could scarcely be let loose into the sewers without danger to the workmen.

"The last of the disinfectants are those which expedite the process of decay, to combine with oxygen, and to become inert. Of this class there are two members, namely, those which act chemically, and supply oxygen, of themselves, to the offensive compounds, and those which merely facilitate oxydation by their physical properties. The manganates and permanganates of potash are the best examples of the first class, and contain a large proportion of oxygen, which they freely give the putrid organic matter, and so destroy it. These compounds have been patented by Mr. Condry, of Battersea, and he supplies them in a state of solution of various strengths. That which I have used in my experiments contained nearly six per cent. of the permanganate, and could be supplied at a shilling a gallon. One hundred and fifty drops of it were sufficient to deodorize a gallon of ordinary sewage; but the disadvantage of it is, that it has no power to destroy the foul gases which have already escaped into the sewer air. Besides this, the cost of the material, even if it were used in proportion of 150 grains to the gallon, would be about £753,000 a year for the city sewage, or more than three millions per annum for that of the whole metropolis. Looking, however, merely at the chemistry of the subject, it must be admitted that Mr. Condry's solution is a powerful and valuable disinfectant.

"The second of this class of disinfectants are the agents which promote oxydation by a physical property, that is by bringing the putrid matters into contact with atmospheric oxygen. There are three of them, namely, fire, water, and porous solids. The first effects the change by active combustion, and the others by the slower process of oxydation, which is called *eremacausis* or slow burning. All of them, however, are complete in their action, and are under different circumstances more or less manageable and useful.

"The value of fire as a disinfectant was known and has been

recognized since the remotest time. The sacrificial altars of early nations were the rude methods by which the agent was employed; and so fully did the ancients believe in its salutary action, that in times of pestilence it was often resorted to as the only effective means of purifying the atmosphere. In the popular mind there has always been a notion that the plague of London was exterminated by the great fire. Powerful, however, as the agent is, it does not appear to be applicable to the destruction of the sewer gases, notwithstanding that the use of it for such a purpose has always been a favorite idea with every new commission to sewers, and is the basis of most of the amateur schemes of the present day. Mr. Bazalgette has stated, in his evidence before the House of Commons, that putting aside all the difficulties for controlling the course of the air, in the main channel of the sewers, and stopping the leakage from the thousands of openings in the street closets and drains, the mere cost of fuel for the furnaces would not be less than £80,000 a year, and perhaps it might reach to upwards of £200,000.

"The destruction of the sewer miasms by the agency of water is not quite so unmanageable, and has therefore received attention from many of the leading engineers of the present day. Mr. Bazalgette says of it, that it is the best and the only available means of purifying the sewers. As to its salutary action there can be no doubt, for its power as a disinfectant in the presence of atmospheric air is manifested in every river in the kingdom. Wheresoever the putrid refuse of a town mixes with a large volume of fresh water, there the process of oxydation is quickly carried out, and the offensive matters are rendered innocuous. Even the river Thames, except at a peculiarly dry and hot season, finds within itself a means of purification which is quite equal to the contaminating influence of the soluble organic matter that flows into it. This is effected by the physical power which water possesses of transferring oxygen from the atmosphere to the putrid products, and this is so great that it will even destroy the soluble organic constituents of ordinary sewage without further dilution with water. I cannot inform you very accurately what quantity of water is necessary for the purpose of disinfection. Already there is a daily supply of about thirty-one

gallons to each of the inhabitants of this metropolis. But this is evidently not sufficient to cleanse the sewers, for, independently of the existence of a putrid atmosphere, there is the stronger evidence of their foulness and the condition of the sewage which is discharged after a heavy fall of rain. And even if it could be determined precisely what amount of water would effect the purpose, there is still the difficulty of distributing it so as to scour out all the channels: for this could not be accomplished without special contrivances for delivering the water at the head of every drain. I do not therefore see much prospect of success in this mode of dealing with the subject.

"The last means of destroying the offensive matter is by the agency of porous solids; and this may be applied either to the sewage itself, or to the gases which are evolved from it. The best examples of such an agent are common clay and charcoal. Both of them operate in the same way, namely, by condensing the putrid vapors within their pores and upon the surface, so as to cause them to unite with atmospheric oxygen, and produce in fact a species of slow combustion, by which the miasms are gradually consumed. To effect this, however, there must be a free access of atmospheric air. Hence it is these substances have but a limited power of deoxydation where they are mixed with a liquid sewage, or are so overcharged with water as to be incapable of absorbing oxygen.

"Every one is familiar with the deodorizing power of common earth; in fact, the grave-yards of every city testify to the enormous quantities of organic matter that can be disposed of through its agency, and no one who has witnessed the rapid deodorizing power of clay when sewage or night-soil is distributed upon the land, can doubt its efficacy. The Chinese have long taken advantage of this power, for they mix night-soil with one third of its weight of fat marl, and knead it into cakes, which are common articles of commerce. In practice also, it is found that a ton of clay will deodorize about three tons of the solid matter of sewage. But, powerful as is this action, it is not applicable to liquid sewage. Even in the case of charcoal, which is a much more energetic deodorizer than common clay, the power is speedily lost when it is mixed with fluid refuse. Dr. Hoffman found that four cubic feet of charcoal began

to lose their power of deodorization when about seventy-eight gallons, or rather more than three times their bulk, of the sewage had passed through them. Mr. Blythe's experiments are to the same effect. To this I may add that the cost of this mode of deodorization would be upwards of £230,000 a year for the city sewage. The remedy would be but imperfect, to say nothing of the fact that it would contribute largely to the solid matter already in the sewers.

"The most effective way of using charcoal as a deodorizer, is to take advantage of its power of absorbing the putrid miasms when they are in a vaporous condition. This power is remarkably great. It was noticed by Sausure as far back as 1814, that charcoal took from 75.90 times its bulk of various gases. Count Morozzo had also observed the same fact, and had directed attention to it; and later still, Messrs. Allen and Pepys found that different kinds of charcoal had different powers of absorption; and yet it is only very recently that we have been well informed in this matter, and we owe our knowledge of it to the researches of Dr. Stenhouse, who in 1858 had his attention directed to the fact, that when dead bodies of large animals are covered with a layer of charcoal, they putrefy without evolving any unpleasant odor, notwithstanding that they are kept for many months.

"*Charcoal as an Air-Filter.*—These results suggested the use of charcoal as a respirator and an air-filter, and soon after Dr. Stenhouse proposed it as a purifier of the foul gases which escape from the street gullies, the sewers, ventilators, and the drains of private houses. One of his air-filters is in action in the justice-room of the Mansion House, and another is in the justice-room of Guildhall, and Dr. Stenhouse reports that their operations have been successful and continuous for a long time. I have myself repeated some of Dr. Stenhouse's experiments during the last twelve months, and have ascertained that the offensive gases from a close cess-pool are completely deodorized by passing them through a small box containing about thirty-six cubic inches of coarsely powdered peat charcoal. I have had this in continual action for three months; and although the charcoal has not been renewed, yet it does not show any sign of derangement or loss of power.

"All kinds of charcoal are not however, equally valuable for the purpose. Dr. Stenhouse found that wood charcoal and peat charcoal are the most effective. Mr. Blythe's experiments at the Board of Health, and the inquiries made in my own laboratory by Mr. Fewrell, are to the same effect. The cause of this superiority is doubtless due to the great porosity of vegetable charcoal. Liebig states that the pores in a cubic inch of beech-wood charcoal must, at the lowest computation, be equal to the surface of one hundred square feet, and several other chemists have estimated it at more than double this amount. Hence the extraordinary physical power of wood charcoal in condensing gases and vapors within its pores; so that when it is exposed to an atmosphere containing the putrid products of decomposition, it absorbs and oxydizes them by a species of combustion that is as effectual as if they were passed through the ignited coals of a furnace.

"Now in making a practical application to these facts, it is manifest that we have in common wood charcoal a powerful means of destroying foul gases of sewers. How it is to be applied is fortunately a question of but little embarrassment, for let the sewers be ventilated as they may, either by open gratings in the street or by the rain-water pipes of the houses, or by pillars of the gas-lamps, or by tubes carried up at the landlord's expense from the drains of every house, or by especial shafts of the public street—in fact, let the gases go out of the sewers how they will and where they will, you have but to place a small box containing a few pennies' worth of charcoal in the course of a draft, and the purification of the air will be complete."

SYSTEM OF SEWERS.—To procure the most efficient system of sewerage, by a well-connected system of sewers, and to determine their proper level, and the degree of declination of which they are capable, according to the situation and nature of the soil of the place, as well as to ascertain what are the best materials for their construction, and the diameters best adapted to give them proper powers of transmission, are questions which, although they must be investigated and deter-

mined by the civil engineer, are still of lively interest to the professional sanitarian. Thus, for instance, he will tell us that the very large sized sewers, such as the *Cloaca Maxima*, unless intended for trunk sewers running the entire length of the city, are not serviceable. Egg-shaped culverts of a moderate size, and, preferably still, circular pipes of small diameter, and perfectly smooth and glazed, are superior, by far, to the sewer with upright sides and flattened segmental invert. It would be difficult to estimate the great amount that might be saved not only by a judicious system of sewerage, but even by a proper form of sewers, unless from data such as those furnished some years ago by Mr. Williams in his examination before Commissioners of whom we have pre-
cedingly spoken. In the Westminster district of London, in forty miles of covered drains built during a period of ten years, a loss of a sum equal to 333,348 dollars was incurred by faulty construction. In the whole metropolis, which includes the city of London, Westminster, the Holborn and Finsbury districts, and the Tower Hamlets, also the Surrey and Kent portions, which include the borough of Southwark, it appears that, during a period of ten years, about 220 miles of sewers were built. The difference between the expense actually incurred in this work by the construction of upright sided sewers with man-holes, and that which would have been required by egg-shaped or arched sewers, with a flushing apparatus, was a quarter of a million of pounds sterling, or about one million and two hundred and fifty thousand dollars. There is much less friction and risk of detention of sewage when the conveying duct is egg-shaped or circular. Even the opening of gully-holes, or the introduction of a gully-neck in the crown of the arch to admit the surface-water of the street into the sewer, produces accumulations. The plan so common in London of forming the opening of private or house-drains at right angles to the sewers, and, to aggravate)

the difficulty, of having them to approach the culvert at an elevation of eighteen inches or two feet above the latter, combines both objections; that of flattened invert and the junction of two sewers at right angles to each other. When sewers meet at right angles, there is a diminution of velocity, and eddies are formed, as well as injurious accumulations of deposit above the point of meeting; the rectangular mode of junction of the sewers increasing the resistance more than 200 per cent. It is of great importance that the internal surface of the sewer should be perfectly smooth, and in order to retain this property, that it should be built of indestructible materials, in part for reasons already assigned, and also to prevent inequalities and cavities from being formed, and the risk of falling of the entire wall by its becoming a burrow for rats, which have a great partiality for public sewers. Of equal necessity is a suitable declination in the line of the sewer, from its upper end, or in the heart of the city, to its termination in a river, or in a reservoir for the purpose. Mr. Hosking, whose calculations were made on certain low situations in Westminster, assumes that a fall of two inches the hundred feet, with a good back-water from a river, at equal intervals, would be sufficient.

So imperfect was the public drainage, not many years ago, in even the best parts of London, as in Regent street and Portland place, that, according to the testimony of Mr. Guthrie, before the Health of Towns Commissioners, there was not, at the time he made his observations in those streets, one gully clean in twenty that were not greatly choked up, and this even during heavy falls of rain. An idea may be had of the little interest felt in a system of progressive sewerage, from the fact, that in some large towns of England, as Wigan, Rochdale, and Bolton, there was not, some years since, the slightest knowledge of the plans of the sewers already made. Neglect of this kind should serve as a warning to the municipal governments in the United States to avoid similar faults.

The escape of deleterious emanations from sewers is prevented by traps or valves at the opening in the upper part, and the termination of the other end under water; and, if the opening at this end is exposed at low tides, by closing it with a gate. In London, Liverpool, and Glasgow, and in Paris and Hamburg, as well as in Boston, New York, and Philadelphia, the mouths of the sewers are exposed at low tide, and constitute an offense to the nostrils, and a probable source of disease. Of the ventilation of sewers we shall speak after awhile. Unless there be an abundant supply of water for keeping the lower and branch drains free from obstruction and accumulation, they will prove a source of annoyance and disease. To give effect to these means, a general and systematic survey of the different levels of a town should be made, and a uniform plan of sewerage adopted. Much trouble, expense, and sickness will be saved in its subsequent history, if these measures be adopted in the beginning of every new town. The rise of such is common enough in our widely extended country, in which the direct wants and necessities of trade, and emulous speculation are continually urging its people to new schemes—the foundation of a second Tyre or Alexandria, of another Persepolis, or Carthage, or Rome. As a general rule, each house-drain at least ought to be provided with a trap or valve to prevent the escape of emanations from the drain into the house. Especially is this necessary where the supply of water is not enough to keep the drain clean. Mr. Simpson, advocate of Edinburgh, urges strongly the advantage of a separation of sewers proper from surface-drains; the first holding sewerage proper, the second giving passage to rain and melted snow. He recommends the entire abandonment of *built* sewers, and the substitution of close pipes or tubes in their room.

The entire separation of sewerage from rain-fall is strenuously urged by Mr. F. O. Ward, in a letter to William Cun-

ingham, Esq., Member of Parliament, in relation to the purification of the river Thames. Mr. Ward's cardinal proposition is, "that *the whole of the rain-fall* is due to the river, the whole of the sewage to the soil." And again, "that just as on the one hand, the sewage proper should be carefully diverted *from* the Thames, just so, on the other hand, should the rain-fall be directed *to* the Thames, to aid its scour—which suffers from every drop withdrawn. To divert a rain-brook is to mutilate a river." Both sewage and rain-falls are rendered useless by admixture.

The proportions of the two, apart from economical considerations connected with the disposal and utilization of sewage, forbid recourse to the same system of conduits for their conveyance. The average weight of the residuum (excluding moisture) yielded to the sewage by each man, woman, and child in London, is about two ounces *per diem*, and by the entire population, 139 tons in this period.* This is an insignificant quantity, if delivered as fast as produced. "But instead of taking measures to secure to London this regular decimal evacuation, we keep, on the most moderate estimate, at least twelve months' *excreta* constantly stagnating under ground, as deposit in the cess-pools and sewers. The mass of putridity thus constantly retained in subterranean London actually equals one day's evacuation of the whole population of Europe and Asia, numbering eight hundred millions."

The rain-fall on the London drainages, Mr. Ward thinks, may yield to the sewage some eighty or ninety millions of tons annually—a total about equivalent to the annual total of sewage. Were the fall of rain equally distributed throughout the year, it could, like the sewage, be easily disposed of.

* Dr. Letheby, as will have been seen in a preceding page, estimates the dry solid excreta of each inhabitant of the metropolis, to amount to from 2 to 2½ ounces, and the entire amount of solid matter contained in the sewage of one day, to be about 152.60 tons.

But so far from this being the case, the whole of the rain-falls on one hundred and fifty-two days of the year, and of the annual twenty-four inches, sixteen fall on forty-four days—or two thirds of the rain in, about one eighth of the days. The disproportion between sewage and rain-fall is such, that, in one day in twelve, the former is to the latter as one to four and three quarters; in ten days in the year, as one to nine and a half; and on some few occasions, annually it is as one to nineteen, and upwards. Nor is the rain-fall assigned to each rain-day diffused over twenty-four hours of time; so that, for example, seven millions of tons of rain, equal to more than a month's sewage, sometimes fall on London in a single hour. "The mixed streams of rain-fall and sewage, liable to be thus suddenly swollen, exceed the capacity of any tunnels that can be built for their diversion from the river, and would overflow in any mechanism at our disposal for their distribution upon the soil."

Let us, with Mr. Ward, consider the effect of a sudden rain-storm falling on London, and pouring through the over-charged subterranean receptacles in the shape of sewers partially banked up with the accumulated sewage. Suppose it were to sweep into the river nine or ten days' accumulation of filth; this would be enough to discolor the tidal river, and in hot weather render its waters putrescent for several days. The money-loss on every such occasion would be, in ammonia only, without reckoning phosphorus, nearly sixteen thousand pounds sterling—\$80,000.

Up to the point of meeting of the two streamlets, the one of the rain from roof and area, and the other of the sewage, from closet and sink, we are free to apply each of them to its proper use. "We can send the unpolluted rain-fall to scour the river, and the undiluted sewage to fertilize the land. But directly this junction-point is passed, directly the rivulet of cistern-water, rich with its freight of ammonia and phospho-

rus, meets and mingles with the casual rain-fall, the two waters become, as we have seen, a worthless, unmanageable mixture, equally unfit for agricultural and urban use. Not only do they cease to be our property, and pass beyond the control of art, but they revert to the domain of nature, spoiled even for her simple service. For this error we are punished by pestilence."

Mr. Ward speaks in terms of gratification at his having, with his friends, succeeded in establishing the tubular drainage of houses and streets, after a ten years' struggle with the engineers. The tubular sewers "are now working successfully by hundreds of miles, not only in provincial towns, but in the metropolis itself." The writer is confident "that this tubular purification of the Thames, will ultimately supersede the monstrous tunnel process, which, if adopted, would cost us many millions, and turn out a gigantic failure after all."

Dr. Huxley proposes to combine the embankment of the Thames on both sides, throughout the metropolis, with the formation of main sewer canals, the contents of which shall be subject to a tidal flushing towards the mouth of the river twice daily from flood to two thirds ebb. The fall in the canals should be only that of the river itself. At certain intervals, the canals would leave the river edge (the embankments to cease), and take a subterranean course by tunnels—five in number, and in length twenty miles on the north side, and three in number, and seventeen miles in length on the south side of the river. By means of the upper divergings from the river, the port of London would be left untouched, while the lower tunnels would obviate sharp bends in the river, which would offer obstacles if followed in the course of the canals.

The depth of the canals should be three feet below the lowest ebb of the stream; their height, four feet below the soil and pavement of the embankment. Taking the rise of the Thames at London Bridge at twenty feet, the canals would

thus be twenty-five feet in depth, and the top of the embankment six feet above high water. The breadth of the canals might be determined according to the area required—say twenty feet, which would give a sectional area of five hundred square feet. All London surface-water, as well as sewage, should be allowed to enter the canals, both as an assistance to the movements of their contents, and a means of frequently lessening the amount of the river-water abstracted from the canals for the purposes of navigation.

If the saving of the sewage for the purposes of agriculture be a settled question, the required accessibility might be obtained at those points on the canals where it is proposed to make them open to the air (Rainham Creek, Gray's Thurrock, and Plumstead Marshes).

"Greatness of the cost is," Dr. Huxley thinks, "about the last consideration which ought to deter from any scheme embracing the power really to do the work. If five millions sterling were required and spent, five per cent thereon would not exceed two shillings per head *per annum* on the population of London."^{*}

The editor of the *Sanitary Review*, Dr. Benjamin W. Richardson, in some remarks and suggestions on this subject (No. xiv.), while noticing the exaggerations respecting the existing evil, admits the necessity of cleansing the Thames, and that such arrangements should be made as shall at once lead to the constant and ready removal of the sewage with which the water is loaded. "Among the temporary plans for relieving the river of its dirty burden, the one most likely to answer the purpose for the present, and it may be for the future, consists in adopting for the direct removal of sewage, a system resembling the present water-conveyance system. A series of pipes laid down on the river-side to receive the sewage flow, and convey it towards the sea from the city,

^{*} *Sanitary Review*, No. xiii.

would at once meet the emergency," as in the plan proposed by Mr. Austin, and in that as described, on a grand scale, by Dr. Huxley, just now placed before our readers.

"There is yet," writes Dr. Richardson, "another idea which has occurred to us, and which deserves at least as much consideration as the majority of the schemes which have been brought before the public. This idea suggests that floating reservoirs might be constructed for the reception of the sewer flow. We see no reason why the contents of a sewer might not be intercepted by a floating reservoir, through which the water part of the sewage might filter, and which, when charged with the solid and valuable sewage matter, might be lugged away for its contents, to be disembarked elsewhere, and disposed of for agricultural purposes. We doubt not, that with this arrangement rendered practicable, all the cost of sewage removal would be undertaken by private enterprise. The lading of sewage vessels with valuable cargoes, indeed introduces merely a new business for the river sailor."

In London, as we learn from the instructive "Report on the Results of Examinations made in relation to Sewerage in several European cities," by E. S. Chesbrough, Chief Engineer of the Board of Sewerage Commissioners, Chicago, there were, in a grand total of 934 miles of covered and 400 of open sewers, 126 of pipes, in 1855. The first pipe sewer was laid in 1848. The greatest length of any one is two and a half miles. Mr. Haywood, Engineer of the city of London, has always laid circular pipes; none smaller than nine inches, nor larger than fifteen inches diameter; the joints are put together sometimes with puddled clay, sometimes with cement.

The return of reflux odors, one of the greatest objections to house-drains, is prevented by three modes pointed out by Mr. Simpson: "First, the water pan *in* and the sigmatic curve under the water-closet and sink; next, another sigmatic curve, if the descent will make it safe, where the pipe joins

the main street-drain; and thirdly, a delicately hung flap valve of galvanized iron at the extreme end of the tube, where it discharges into the main drain. The valve will always be shut, except when opened by a flow from the house." In the severe winters of our climate, obstructions to the easy working of these contrivances will not unfrequently occur, owing to the water freezing in the supply-pipe. For his sewers, Mr. S. rightly asserts that water in unstinted proportion is indispensable, but especially for a system of tubular sewers, which cannot be cleansed by any other method.

For drains, earthenware pipes, glazed, are preferable to brick conduits, which sometimes allow of exudation of their contents. The size of a pipe for a drain will depend on the number of houses. In one instance, in London, an 18-inch drain was carried 400 feet at the back of forty houses, where there was a good supply of water, and it was kept clean.

Robert L. Viele, Esq., Civil and Topographical Engineer, in a statement in the Senate Committee Report, expresses unhesitatingly his opinion, that one of the chief causes of mortality of the city of New York, "is to be found in the defective drainage of certain districts of the city, and furthermore, that this is an evil which is increasing as the city extends itself towards the northern portion of the island, and that the main elements by which this evil is increased, are the so-called city improvements, or grading of streets or avenues which are now being carried forward."

Mr. Viele then describes the intricate topography of the island of New York: "Abrupt ledges of rock, deep and narrow valleys, sudden upheavals and contortions of the geographical formations," with a surface varying in elevation from 5 to 150 feet above high-water mark. "Winding along this varied surface in every direction, are the original drainage streams, one of them of such an extent that it was formerly used for mill purposes." No attention having been paid to the original

topography of the island, in the arrangement of streets and avenues, deep ditch excavations and high embankments have been made, so that these latter cross the old valleys of drainage, and become so many drains for the collection of water all over the island, which in summer are converted into "stagnant pools, breeding pestilence and disease." The earth dumped in to absorb the water, when it is desired to *improve* these lots, soon becomes saturated, and forms a sort of sponge through which the water ascends, and continues to be a permanent source of humid and noxious exhalations. No system of sewerage in which the sewers are only ten or twelve feet below the *grade* of the streets, can remedy this evil, when in some instances the underground streams are forty feet below the grade of the streets, "being thirty feet between the bottom of the sewer and the water of drainage." Melancholy evidence of the evils arising from habitation of a made soil, thus improperly drained, is afforded in the sacrifice of lives among the wretched victims sent to the present "Halls of Justice," or the "Tombs," as they are appropriately called, which are built on the site of the old Collect Pond, seventy feet deep—it was here that Fitch launched his first steamboat. The pond was connected with the Hudson River, by a stream running through what is now Centre and Canal streets; in this section of the city it is impossible to have dry cellars.

In giving farther currency to Mr. Viele's statement of the actual impediments to a complete system of drainage of the city of New York, and of his remedy, which we subjoin, our design is, as in the cases of hygienic deficiencies in other cities, not merely to incite to a reform in them, but also to furnish warning to new cities, or those in embryo, against the commission of similar mistakes and omissions in their incipient plans for civic improvement. Mr. Viele describes his remedial measures as follows :

"The remedy to be applied in the lower part of the city is

to widen the narrow streets, and to raise the grade where the streets pass through the original depression of the surface. Narrow streets, under any circumstances, are a curse to a city. They are too generally the abodes of vice and crime. In them an ordinary sickness spreads into a pestilence, and a fire into a conflagration. They are always filthy in summer, and frequently blocked up with snow in winter. They are not fit for business purposes, for they stifle commerce; nor for residences, for they breed disease. Wide streets, on the contrary, are more healthful and cheerful for residences, and more useful and valuable for business purposes. There is less danger from fire, as the flames cannot spread across the street. They are cleaner in summer, and are never impassable in winter. By constructing lateral drains along the slope of the depressions in the lower part of the city, and connecting them with the sewers, they will intercept the water in its descent, and prevent its accumulation in the original basins; and then raising the grade as is proposed in the accompanying profile of Worth street, at the same time widening the streets and perhaps discontinuing some of the short and insignificant streets in the 6th Ward, the health of the city will be improved one hundred per cent. So far as regards the upper part of the city, it is absolutely necessary that some system should be adopted for the free flow of water along the channels of the original drainage stream. This can be done by building more substantial culverts beneath the streets, and by the construction of permanent drains, so built as to admit of the percolation of water through the interstices of the covering. These drains should be excavated to a firm substratum, and every property owner should be compelled to construct, of a uniform character, that portion of each drain which may pass through his property."

Disposal of Sewage.—The subject of the application of sewage for agricultural purposes has been freely discussed of

late years, especially in connection with its deodorization, and subsequently the free and more general use of it than could be obtained in its unaltered and offensive state. The practice of the Chinese, the most economical cultivators of the soil, is quoted at the same time, and their practice of uniting clay with fecal collections, and selling the compound for manure, referred to. Objections have been made to the deodorizing of sewage by chemical agents, on the ground of their neutralizing the ammonia, and destroying one of the most active of the excitors to vegetable growth. It has been computed, that if the whole drainage of London could be employed for manurial purposes at a sufficient distance from the city, the annual increase in the value of the land to which it would be applied, would exceed half a million of pounds sterling, or about two millions five hundred thousand dollars. An estimate by Mr. Smith, a distinguished agriculturist, places this question in a strong light. It rates the annual average value of the excreta of each individual at five dollars; so that, taking the whole population of Great Britain and Ireland at twenty-eight millions, we are positively, says this writer, *throwing away* every year that which is equivalent to *twenty-eight millions sterling*, or 140 millions of dollars. The actual salable value of the excreta in Belgium is thirty-seven shillings, and at this rate, continues the English writer just named, we may be said to be depositing the worth of fifty-one millions sterling in the ocean that washes our shores.

According to Dr. Lyon Playfair, a pound of urine is capable of increasing the production of grain by an equal weight; so that even allowing for some exaggeration in this estimate, the human urine wasted in the British kingdom would serve to produce more than all the grain required for the consumption of their entire population, besides affording through its fertilizing influence on lands at present imperfectly tilled, or not tilled at all, a source of employment to a superabundant laboring population.

Mr. Campbell, in an address on the utilization of sewage, says: "The chief element of the manurial value of town sewage is the excremental material, and this, in the instance of London, with a population of 2,600,000, amounts annually to 53,393 tons of dry solid,* which, as I have already shown, contains ingredients which give it a value of fifteen pounds sterling (\$75) per ton, at least.

The quantity of ammonia which this contains,

or is capable of producing, is 11,440 tons.

The phosphoric acid, 1,839 "

And the potash, &c., 1,331 "

These three items make up a money value of about 836,834 pounds sterling, equal to 4,184,170 dollars.

The number of methods that have been proposed for obtaining manure from town sewage may be considered, Mr. Campbell thinks, under three heads.

1. Filtration through various media, and after the addition of chemical substances.

2. Precipitation by means of various re-agents.

3. Irrigation.

Reviewing the three modes here named, Mr. Campbell inclines to that by irrigation, and concludes, that by no process of chemistry hitherto known, can a highly valuable solid material be procured from town sewage alone.

Mr. Ward, in his letter to Mr. Cunningham, of which we have already made large use (p. 509), says on the present theme: "In the first place I would remind you, that to throw away the ammonia and the phosphorus of the London sewage, is virtually to throw away bread. Town sewage, which many engineers look upon as refuse to be discharged, I regard as property to be administered. The proper outfall for the London sewage is not this or that point of the river or of the sea,

* There must be some mistake in this estimate, which is not made more than a third of that made by Dr. Letheby.

but a suitable tract of land growing exhausting crops. Fifty farms of a thousand acres each might be raised in value at least ten pounds per acre *per annum*, equivalent to five per cent. to ten millions of capital. This ought not to be thrown into the sea."

VENTILATION.—Two great requisites for the healthy existence of human beings, are due supplies of pure air and of pure water. Without these, the most abundant food and all the appliances furnished by science and art will be of little avail; and yet, by a singular inconsistency in human conduct, there would seem to be a fixed determination on the part of the majority of mankind to deprive themselves of these essential elements of health. Air, in an especial manner, is shut out from habitations by all kinds of contrivances, or, when allowed ingress, it is deteriorated by admixture with emanations from decayed organic matter, or from living bodies brought together in large numbers, to meet the wants of what is called civilization.

The atmosphere by which we are surrounded and from which, by means of respiration, our bodies derive the oxygen, or vital element of the air—that necessary for the support of life—is at the same time the great reservoir into which flow all the exhalations from the bodies of men and animals, and those resulting from the animal and vegetable decay which takes place on the surface of the soil. If not carried into space in the upper air by winds, they would prove a destructive poison to all the people congregated in cities and towns. The process by which these exhalations are removed is ventilation; and the more complete it is, the healthier are the inhabitants; as, on the other hand, its imperfection and neglect are productive of diseases of the worst kind. Streets are so many channels for conveying the requisite air to the inhabitants of the houses on either side of them;

and the wider and more numerous are these channels, the more completely is their object, in this respect, attained. Proportions ought to be preserved between the breadth of a street and the height of the houses in it. If the latter be very high, and the former narrow, both the air and sun are prevented from reaching the street, and lower portion of the houses. Still greater detriment, in this respect, is experienced by the occupants of narrow alleys and small courts, in which unfortunately the crowd of inhabitants is greatest, and the supply of fresh air and suitable ventilation the least. Every sanitary investigation, down to the last made in New York, goes to show the magnitude of the injury done to the public health by this last-mentioned state of things. The ills thence resulting are on the increase, since they follow, too generally, in certain but not well-defined proportions, the growth of the cities themselves. No excuse, therefore, will be offered for dwelling on this subject, first by presenting the darker and repulsive features, and then under its remedial and preventive aspect.

Few pause, says Dr. D. B. Reid, to consider the necessary consequence of 20 respirations per minute, 1200 per hour, or 28,800 in a single day and night for every adult human being, and of his abstracting, during this period of twenty-four hours, from the atmospheric magazine, his portion of air, amounting to fifty-seven hogsheads, of which he retains vital oxygen to the amount of about twenty pounds, that enters into his blood, and there serves to maintain the activity of all the functions of life, corporeal as well as mental. It has been estimated that about one fourth of all the air drawn into the lungs by inspiration is altered in these organs, and is no longer fitted for respiration. The alteration consists, first, in the abstraction of the vitalizing element of oxygen; and secondly, in the addition of the deleterious and poisonous gas—carbonic acid—which, together with volatilized animal matter, is given out by expiration, and passes into the outer and common atmo-

sphere. But if, instead of a free inhalation of pure atmospheric air, there takes place that of a noxious or impure air, from which the exhaled carbonic acid has not been carried away, two results ensue: first, the individual fails to receive his proper proportion of oxygen, while he suffers from the inhalation of the noxious carbonic acid gas; and secondly, the lungs are unable to eliminate from the blood with their usual freedom the noxious products, including this very carbonic acid, or its base, carbon, the retention of which, together with the animal matter (previously mentioned) in the system, is productive of serious disorder in itself, and predisposes to the attacks of current diseases. This abnormal condition of things will continue, with aggravation, on to a fatal termination, if the same air be breathed over and over again, without its being displaced by a purer air; that is, without ventilation being carried on. Bad ventilation, as well said by Dr. Reid, is also injurious to the mind as to the body; and, where it is utterly neglected, not only produces headache and apoplexy, but, conjoined with other circumstances, is prone to favor that depression which leads at times to low spirits, and even to suicide.

Defective. Ventilation—Crowded Streets and Habitations.—Taking into account the physiological data just mentioned in connection with the facts previously described, of the noxious effluvium of the gases resulting from the putrefaction of animal and vegetable matter, we find a ready explanation of the great amount of sickness and high death-rates among the crowded courts and cellar population in Liverpool, Birmingham, New York, and other cities. In Liverpool, in 1841, there were 2,398 courts containing 68,365 persons. In the parish of Birmingham, the older and more densely inhabited parts of the town, there were 2000 courts, containing 50,000 inhabitants. In Liverpool: it was not enough, for outraging humanity and common-sense,

that, gloomy and badly ventilated as the houses themselves were in the courts, there were found cellars under more than one half of them, or 1272 in number, occupied by 6290 persons. The whole number of cellars in Liverpool was 7892, containing a population of nearly 40,000 persons, or five persons on an average to each cellar. Aware, as we are, of the impossibility of a ventilation of these courts and cellars, and the continued deterioration of the air by exhalations from them and their inmates, we need not wonder at the bad eminence which that city, after the registration act had gone into full operation, unexpectedly acquired, on the score of disease, and the short average duration of life of its inhabitants, taking them in the aggregate. Reference has been made in a previous part of this report to the greater amount of sickness and mortality in the undrained than in the drained cellar districts of Liverpool. The concomitant evils attending this crowded population are tersely described by Dr. Reid, in speaking of the 8000 houses in Nottingham, built back to back and side to side, and with no other outlet than the street-door. "Suffice it to say, that in such quarters it is hardly possible that a family can preserve for any term of years, either decency, morals, or health." Worse, if possible, than the scenes exhibited in some English towns, is the condition of the poor in the chief cities of Scotland. Dr. Arnot, among other details, relates that in some of the wynds of Edinburgh and Glasgow, there were no sewers or drains, and the dung-heaps received all the filth which the swarm of wretched inhabitants could give: he learned that a considerable part of the rent of the houses was paid by the produce of the dung-heaps. The interior of these houses, and their inmates, corresponded with their exterior. "We saw half-starved wretches crowding together to be warm, and in one bed; although in the middle of the day, several women were imprisoned under a blanket, because as many others, who had on their backs all'

the articles of dress that belonged to the party, were then out of doors in the streets."

The pictures drawn some years back by Dr. J. H. Griscom, of the diseases and mortality caused by residence "in the damp, dark, and chilly cellars" of New York, and of "the degraded habits of life, the filth, the degenerate morals, the confined and crowded apartments, and insufficient food of those who live in more elevated soil, engendering a different train of diseases, failed to arrest the attention of the authorities. The evils have been allowed to go on increasing, until at last their alarming excess has led to official investigations, the results of which fully confirm all that Dr. Griscom, and other sanitarians on the spot, had previously proclaimed. They are embraced in a "Report of the Select Committee appointed to investigate the Health Department of the City of New York," which, together with a large amount of appended documents, in the shape of medical and other testimony, and tabular matter, was transmitted to the Legislature, February 3, 1859. A startling fact which tells in a few figures the deplorable state of the public health in the city of New York, is its gradual deterioration, with some interruptions and short rises, during the last forty-six years. Thus, we learn that in 1810, with a population of 96,713, the deaths were 1 in 46.6; whereas, in 1857, with a population of probably 700,000, the deaths were 1 in 27.15. The testimony of Dr. Griscom, in Committee, is full of instructive details, direct and comparative, on the subject of the causes of the increase of death-rates in New York. He shows that if the mortality of London bore the same ratio as that of New York to population, it would have been 92,784, in place of 56,786, which was its actual mortality. Dr. G. quoted from the Report of a Committee of the Association for Improving the Condition of the Laboring Classes in the City of New York, in which the dwellings in many parts of the city are thus characterized:

" Crazy old buildings ; crowded rear tenements in filthy yards, dark, damp basements, leaky garrets, shops, out-houses, and stables, converted into dwellings, though scarcely fit to shelter brutes, are the habitation of thousands of our fellow-beings in this wealthy, Christian city." " In Oliver street, Fourth Ward, for example, is a miserable rear building, 16 feet by 30, two stories and garret, three rooms to each of the first and second floors, and four in the attic; in all, ten small apartments, which contain *fourteen families*. The entrance is through a narrow, dirty alley, and the yard and appendages of the filthiest kind." In Cherry street, is a " tenement-house," in two lots, extending back from the street about 150 feet, five stories above the basement, so arranged as to contain 120 families, or more than 500 persons. " But the most objectionable habitations in this district are the cellars, in some instances six feet under ground, which have to be bailed out after every rain-storm, and are so damp as to destroy health, so dark as to prevent industry, and so low that ventilation is impossible. Though utterly unavailable for every other use, they are rented, at rates which ought to procure comfortable dwellings, to persons who have become as debased in character, as the condition is degrading, in which they live." Many of the poor of the Sixth Ward " are in a condition incomparably worse than the hovel-dwellers, where father, mother, children, and swine live and lodge together." In the Eighth Ward, " Rotten Row," so unlike the fashionable locality in London thus called, " consists of eight houses on either side of the street, fronting each other, with as many more in the rear, containing, in all, about two hundred and fifty families, and not less than one thousand two hundred and fifty persons, in a space of about one hundred and eighty feet, by, perhaps, a depth of fifty feet on each side. The pestiferous stench and filth of these pent-up tenements exceed description. In one room, says a visitor, six people are living, with

hens scratching about on the bed. Every corner of these buildings is occupied—cellars and garrets." The cellar population of New York is believed to be twenty-five thousand. What makes the case worse with the occupants of these tenements and cellars, is, the circumstance of many of them being emigrants from Europe, particularly from Ireland and Germany, who, during, their voyage, had suffered from defective ventilation, in their being crowded between decks, and compelled to breathe much of their time a damp and impure air. Among the diseases arising from, or singularly multiplied and aggravated by, what Dr. Griscom terms "internal domiciliary causes," are Cholera Infantum, Diarrhoea, and Erysipelas, which have been increased in a high proportion since 1820.

Dr. Samuel Rotton, in his testimony before the Committee, repeating, in a summary manner, what had been said by Dr. Griscom, and, to a certain extent, also by Dr. McNulty, affirms the chief causes of the mortality in New York to arise from a great number of the inhabitants living "with the smallest amount of air that is necessary to keep life in them, and the smallest possible quantity of light with which they can possibly see and get along with; and these causes have been proven by Dr. Griscom to produce much greater mortality than bad food or bad clothing, because, the people who have lived in the same way, with the same food and clothing, in better localities, have been seventy-five *per centum* better with regard to mortality than those who lived in cellars and other dark, unventilated, and miserable places." During the cholera season of 1849, in New York, Dr. Rotton noted the fact of the great mortality from the disease among the occupants of cellars, and hence, it became his invariable practice to have such persons, when attacked, immediately removed. He does not know of a single case of recovery of those who were not removed. "The reason is obvious," continues Dr. R. "In many of them I was obliged to wade my way upon

bricks, before I could stand upon the floors, for the water would cover my feet." In the same year, Dr. Rotton attended a great many patients who were attacked with Typhus or Ship Fever, and with results similar to those just noticed in regard to Cholera. All whom he could not remove from the cellars, died—whereas, those who were situated in well-ventilated places fared much better. He mentions the cases of two men lying sick with Typhus Fever, "in a back alley-way." His constant recommendation, at every visit, to admit fresh air, was as constantly disregarded, and on his return, each day, he found the windows again closed, the door closed, and a number of persons living in the same room with the sick. At last, Dr. Rotton, becoming exasperated, broke out every pane of glass in the upper portion of the windows. His patients gradually improved, and recovered. Dr. D. Meredith Reese, in his testimony before the Committee, lays down the proposition, that "The true criterion and best index of atmospheric impurity, in any city, or other locality, is manifested in young children, whose greater susceptibility to morbid causes, by reason of their greater delicacy of structure, renders them the earliest victims of atmospheric poisons. Hence the fearful aggregate of infant mortality in New York, which authentic statistics disclose, is at once the fruit and the proof of the contaminated air they breathe, in the wretched habitations of the poor, where confined and ill-ventilated apartments render healthy respiration impossible." Dr. Reese assigns other causes for infant mortality, which do not come under our present head, but which are suggestive of the importance and necessity of sanitary reform, not only in New York, but in most other cities. His views on the exceedingly interesting topic of infant mortality in large cities, have been embodied in a Report to the American Medical Association, which he offered as part of his testimony before the New York Committee.

The morbid effects of crowding and deficient ventilation are well illustrated by comparison with an opposite condition of things, as set forth by Dr. Richard S. Kissam. The comparison is of the state of health of two wards in New York, the most healthful and the least healthful. In the Sixth Ward there were twenty-five thousand inhabitants in 1856, having one thousand four hundred dwellings, and the deaths were one thousand and eighty-nine. In the Fifteenth Ward the population was twenty-four thousand and forty-six, who occupied two thousand four hundred and forty-five dwellings, and the deaths among whom were four hundred and thirty-six. The proportion of deaths in the Fifteenth Ward is one in fifty-five, and in the Sixth Ward one in twenty-three. The contrast, as set forth in the Report itself, between the Fifteenth and the First Wards in 1857, was still greater. The proportions were 1 in 69.68 in the former, and 1 in 21.96 in the latter. Dr. Kissam states the difference between New York and Philadelphia, on the score of public health, to be, that almost every family in the latter city has a tenement in itself; the members of it are well provided and comfortable. "The city, of course, has a larger number of houses in proportion than our own. It is very seldom that there is more than one family in a house; but here, as has been stated, there are twenty or thirty families in one house." To the question, "Then you regard ventilation as a great principle connected with the preservation of health?" Dr. Kissam replies: "Most assuredly, even in higher walks than among the poor. Our Academy of Medicine will sit, night after night, being poisoned, so that those who are sensitive on this point, invariably have a headache the next day. The Historical Rooms, the new building, is very badly ventilated. The subject of ventilation is one that seems to escape the attention of builders as well as of officers."

Examples of the connection of overcrowding with the de-

velopment of Typhus, Scarlatina, and Cholera, are numerous. Some striking cases of this nature are recorded by Mr. Cox, in the *Sanitary Review*, April, 1858. In the limits of two streets, in the village of Bromley, fifty-three cases of fever occurred. The disease did not extend to the rest of the village, neither did it break out elsewhere within the district. The evident cause of this local fever, and its mortality, was the "awful" overcrowding. Each house consisted of four rooms, about twelve feet square. "An entire family lived and slept in each chamber. In one, Mr. Cox counted seven human beings, who occupied the same filthy couch—a father, mother, three adult daughters, and two younger children. In a second room, six persons slept, viz., a widow, her two grown-up daughters, an adult son, and two young children." It is unnecessary to say that the rooms were indescribably foul, fetid, close, and disgusting. "In the above instance," continues Mr. Cox, "we can have no hesitation in ascribing the concentration and severity of the fever-poison (if not indeed its actual development) to the vitiated atmosphere produced by the overcrowding." He made every inquiry, but was quite unable to trace the origin of the disease to any other sources. Dr. Duncan, of Liverpool, described, some years ago, a filthy, pent-up court, one of the thousands in that city, with an area of only one hundred and fifty square yards, occupied by one hundred and eighteen inhabitants, or about one and a quarter square yards to each. This average breathing room is only one half of what it ought to be at night. In this court, fifty cases of fever, or nearly one half the population, were attended by the Dispensary in a single year. Some of the most frightful ravages of Cholera on record were owing to the direct pulmonary poisoning by impure air and animal effluvia, accumulated for want of suitable ventilation. Examples of this nature have been furnished in all parts of the civilized world—in the East Indies, at Karrachee, among the

troops, at Juggernaut, among the native population, also in the crowded and ill-ventilated barracks ; in England, among the brickmakers at Southal, the hop-pickers at East Farleigh, the pauper children at Tooting, the lunatics in the Wakefield Asylum, the convicts at the Wakefield Old Prison, the inmates of the Millbank Penitentiary, and of the Taunton Work-house. At a time when no case of Cholera had occurred in the neighborhood of Tooting, and when, indeed, even Diarrhoea was not at all prevalent in the village, three hundred of the inmates of the establishment were smitten with the secret pestilence, and of these no less than one hundred and eighty died. The girls, whose dormitories were the most overcrowded and the worst ventilated, suffered more severely than the boys. The essential cause of all this mortality was declared to be "the inordinate crowding of the establishment." The numbers crowded together into the dormitories were so great, that each boy had only one hundred and fifty cubic feet, and each girl one hundred and thirty-three cubic feet of air allowed for respiration, and some of the apartments were, at the same time, so faultily constructed—there being windows on one side only—that no effective ventilation could possibly be kept up.

How far this scant supply of the *pabulum vitæ* falls short of the requirements of health, may be inferred from the recommendation of the inspectors of prisons in England, some years ago, that every prisoner should have one thousand cubic feet of air, and from the estimates which have been made in other quarters, that health and strength cannot be maintained in a space of less than seven hundred to eight hundred cubic feet ; and that to live and sleep in a space less than four hundred to five hundred cubic feet for each individual, is not compatible with safety to life, even where there is no extrinsic or superadded cause of atmospheric impurity. And let it not be supposed that even the first-named spaces would be suffi-

cient in a hermetically-closed box or chamber, for life would become extinct long before the oxygen had been consumed.* In Philadelphia, we have had some sad reminders of the pernicious effects of overcrowding and want of ventilation in the mortality, and preceding horrors in the old Arch Street Prison, during the cholera season of 1832, and in the Blockley Almshouse in the epidemic of 1849. We may note also similar catastrophes in the Bucks County Poorhouse, and the Baltimore Almshouse. Although Philadelphia, Boston, and Baltimore compare advantageously with New York in their annual death-rates, yet they have also their dark spots, their bad districts, in which physical is associated with moral degradation and impurity, and Cholera claims its largest proportion of victims. Whatever effects may be attributed to bad or defective supply of food in the production of this disease, it has been said, with no doubt much truth, that the state of health, as well as the proclivity to disease, is influenced much more by the condition of the air that is breathed than of the food that is eaten. The foul and fetid atmosphere, continues the English writer,† of our Whitechapels, and Bermondseys—aided often by intemperance—has more to do with the haggard looks and earthy complexion of these denizens than even penury or want. Dr. Letheby, in visiting some of the rooms tenanted by poverty-stricken beings crowded together, found the atmosphere so close and unwholesome, and infected with that peculiar fainty and sickening smell so characteristic of the filthy haunts of poverty, that he endeavored to discover the special offending element. He ascertained that the contaminated and reduced air was not only deficient in due proportion of oxygen, but that it contained three times the usual amount of carbonic acid, besides a quantity of alkaline matter that stank abominably, doubtless the

* Brit. and For. Med.-Chir. Review, vol. vii., 1851.

† Ibid.

product of putrefaction of the various fetid and stagnant exhalations that are given off from the unclean body, and a pestilential scourge of disease, the consequence of heaping human beings into such contracted localities.

Observations have been made, and to such an extent as to justify the belief, that the intensity and mortality of Scarlet Fever are greatly increased by overcrowding. Mr. Cox, already quoted, describes an outbreak of this Fever with fearful and uncontrollable malignity in a dismal court at the back of Covent Garden, London. There were altogether nineteen cases in the three houses, whereof ten terminated fatally. Mr. Cox "can confidently attribute this fearful mortality to the overcrowding; as, although the disease prevailed extensively in the neighboring streets, it did not assume the same malignity of type, and yielded to remedial measures." Both Mr. Cox and a friend who accompanied him, and shared the professional duties with him on his visits to this forbidding spot, contracted the disease, and narrowly escaped with their lives. Measles have nearly double the mortality in the crowded north-western districts, that they have in comparatively thinly peopled south and south-east ones of England. Even though we must attribute a good deal to the ready transmission of contagious disease among a thickly planted population, we can hardly doubt, as suggested by Mr. Simon, that a general weakness of constitution, conjoined with defective sanitary arrangements, greatly aggravates the fatality of the contagious diseases in question.

Predilection of Cholera for Old Haunts of Disease.—Dr. Laycock, in his highly interesting report to the Health of Towns Commissioners, on the Epidemics of York, tells us, that the first steps of the plague which used to ravage that ancient city in the middle ages, down to the early part of the seventeenth century, seem to have been very similar to those of the cholera in 1831, marking the badly-drained dis-

tricts by its course, as did the latter. "It is a singular coincidence," remarks Dr. Laycock, "that while the cholera commenced in the Hay-market, near the traditional spot of the plague under consideration (in 1604), and probably near to that of 1551, the first death from cholera took place also in the parish of St. Michael, Spurriengall, and on June 5th." It was in this parish, and on June 4th, 1604, that the first death from plague occurred. The first case that occurred in the town of Leith (Edinburgh), in 1848, took place in the same house, and within a very few feet of the same spot where the epidemic of 1832 commenced its course. On its re-appearance in the town of Pollockshaws, it snatched its first victim from the very same room and the very bed in which it had broken out in 1832. Its first appearance in Bermondsey was close to the same ditch in which the earlier fatal cases occurred in 1839. At Oxford, in 1839 as in 1832, the first case occurred in the county jail. This return to its former haunts has been observed in several other places, and the experience in foreign countries has been similar. At Groningen, in Holland, the disease in 1832 attacked, in the better part of the city, only two houses, and the epidemic broke out in these two identical houses on the visitation of 1848. But it was observed, that while in both epidemics, those of 1832 and 1848-9, the disease was localized in precisely the same districts, several of them have changed places in the relative degree in which they have suffered. The earliest case of cholera in Chelsea (near London), in 1848, is said to have been in Whitehall Court, and there it continued to exist until the end of the epidemic in 1849. The first case in 1854 was in the same place, perhaps also in the same house, in both visitations. A very similar fact is presented by Augusta Court, in which the three earliest fatal cases of cholera, in Chelsea, occurred in February, 1832; and which being revisited in 1854, continued to furnish victims to the pestilence throughout the

early duration of the outbreak. Kent and Mew streets, Southwark (on the south side of the Thames), which were severely visited at an early period of the last epidemic, were also among the first seats of cholera in 1832. Dr. Acland relates that, with one exception, every yard and every street in St. Thomas's parish, Oxford, which had been attacked by cholera in 1832 and 1849, was revisited in 1854.

It is evident, from these and many more analogous facts, that, although we are unable to explain all the conditions for the development of cholera, it is impossible for us to deny the great influence of locality on its production.

Public Lodging-Houses.—To speak of overcrowding is at once suggestive of public lodging-houses, long a recognized and prolific source of disease and vice. They are in all large cities the nightly resorts, not only of the migrating laborer and traveling artisan, but, also, of the lower mendicants, thieves, and prostitutes. It was no uncommon thing, as Dr. Duncan related, when writing on the sanitary state of Liverpool, for the keepers of lodging-houses, in that city, to cover the floor with straw, and to allow as many human beings as could manage to pack themselves together, to take up their quarters for the night, at the charge of a penny (a little over two cents) each. The havoc made by the cholera in the lodging-houses of Manchester was terrible. In some of them as many six or eight bodies were contained in a single room, which was crowded promiscuously with men, women, and children. Dr. Howard, after showing the lamentable extent to which they become hot-beds of febrile diseases of the most violent and fatal character, owing mainly to their filthy and unventilated condition, thus describes the morals of their frequenters, and their malign influence in this way on the young and inexperienced: "They serve as open receptacles of crime, vice, and profligacy, and as nurseries in which the

young and yet uninitiated become familiar with every species of immorality. They are the haunts of the most depraved and abandoned characters, as well as the most miserable and suffering objects of the town (Manchester), and constitute one of the most influential causes of the physical and moral degradation of our laboring population." In Glasgow, where the same evils prevailed to an alarming degree, the lodging-houses have been subjected to regular municipal supervision and ordinance, and, as we are told, with excellent effects. Partial inquiries made in our large American cities, reveal a state of things approaching to the evils just pointed out as so common in those of Great Britain, and which call imperatively for the ameliorating and reforming influences introduced with success of late years in different parts of this kingdom. To these we shall soon advert.

General Want of Ventilation.—But the evil consequences of crowding and defective ventilation are not confined to the poor and the destitute. Wherever people are brought together for religious worship, for amusement or recreation, in the halls of legislation and of law, in school-rooms, hospitals almshouses, and prisons, the neglect of sanitary measures, and especially of ventilation, is the rule. Attention to this paramount means of preserving health is the exception. Nor are the mansions of the rich and tasteful exempt from the penalty of infraction of one of the chief if not the very first of the natural laws. This stricture is still more applicable to modern than to old houses.

In modern houses, the neglect of ventilation is extreme, as far as regards recourse to any other means of obtaining it than the windows of the rooms. All the fire-places, as they used to be called, are hermetically sealed by slabs of marble, and when the register of the flue, by which warm air is introduced, is closed, as at night, or when the room becomes too warm in

the day, there is no aperture, either for the admission of fresh air from without, or for the escape of foul air from within. During the night, the windows and doors are closed, and the supply of air fitted for respiration becomes exhausted long before morning, especially if, as is so commonly the case, there be several persons sleeping in the same room. Headaches, restless slumbers, nervousness of various kinds, palpitations, oppressed breathing, and loss of appetite, are no unusual effects of defective ventilation in the houses of the wealthy, who, at the very time, may be commiserating the poor for their small and close apartments. It is indeed time that architects should wake up, and think of constructing houses in which the inmates can live without a continued infraction of the laws, by compliance with which alone they can enjoy health and serenity of mind. Benevolent individuals and societies have taken the state of the defective lodgings of the poor into consideration, and have set about, in some instances with entire success, the devising and execution of the needful remedies. Let us hope that the rich will, in due time, come in for a share of this well-directed philanthropy.

We hear much of applied science, but the community has yet to learn its direction towards a better system of either public or private hygiene. Both proprietors and builders of houses are, for the most part, quite innocent of the desired knowledge of this subject. Division of rooms for business or family wants in the interior, and decorations externally after some order, Greek or Gothic, or a barbarous blending of both, are the only things thought of in relation to modern structures. How the inmates are to procure an adequate and continued supply of fresh air, and how to get clear of that which is impure, are not even secondary matters: they are sometimes discussed as curious questions of philosophy, but seldom with a view to their direct bearing on health. Wearied, oppressed, and giddy, and with palpitating hearts and hurried breathing,

how many, after leaving a church, have mistaken their really disturbed states of the physical man for those which result from the workings of the Spirit; and have retired to their homes, full of terrors for the state of their soul, when, in reality, they were suffering from a disorder of their corporeal functions, induced by the impure and half-poisoned blood circulating through their veins? We are familiar with the "blue Monday" of dissipated and drunken workmen and laborers, who pay the penalty of a recognized gross infraction of natural laws on the preceding Sunday, but we are not often aware of the well-defined "blue Monday," as exhibited in feelings of languor, depression of spirits, and unevenness of temper in those who have sinned against these same natural laws, albeit in a different manner, by their three goings to church, including an evening service on the Sabbath, and breathing all the while an impure air. Dr. D. B. Reid, who visited numerous churches in hot weather, to observe the effects of bad air on the congregations, gives the result in a very graphic sketch, which we regret not having room to insert. We would refer to his work, entitled *Illustrations of the Theory and Practice of Ventilation, with remarks on Warm Air, Exclusive Lighting, and the Communication of Sound*, for much valuable information on the entire subject embraced in our present notice.

The same author has favored the public with a more recent treatise on *Ventilation in American Dwellings*, with a series of illustrative diagrams; and to this eminently practical work, Dr. Elisha Harris has contributed an *Introductory Outline of the Progress of Improvement in Ventilation*. The volume is replete with instruction on a most interesting, we might say vital topic.

Dr. E. Harris, after stating "the imperative necessity of giving prompt and efficient attention to the removable sources of danger and disease which exist in our communities," presents the subject in a very lucid manner in the shape of the following propositions:

"*First.* We would refer to the fact that more than one half the entire population of the city of New York reside in crowded tenement-houses, and that there is no statute or municipal law regulating the construction, ventilation, or the space allowed to specified numbers of residents therein. Hence crowding such structures to their utmost capacity has become the rule rather than the exception. And it may here be stated, that our city has an underground or cellar population of more than twenty-five thousand persons.

"In the 17th Ward alone, there are 1257 tenement-houses, having 20,917 rooms, which are occupied by 10,123 families, embracing a total number of 51,172 persons; thus giving an average of about four persons to each suit of two apartments, one only of which is usually occupied as a dormitory, and that one often a dark, close room, of a capacity only of from 500 to 800 cubic feet. Now, in a close apartment of only 600 cubic feet, a single person cannot spend six consecutive hours, in air of ordinary temperature, without impairment to health.

"Dr. Reid's estimate of ten cubic feet of pure air per minute, for the respiration of an adult person, is certainly quite low enough for an average of comfort and safety, and with such an allowance, the air in such an apartment would become too much vitiated for healthy respiration at the expiration of sixty minutes or one hour; and allowing that the air is partially replenished during that brief period, the atmosphere would be decidedly unwholesome at the expiration of two or three hours. Or, taking the lowest estimate within the limits of safety, as given by Dr. Neill Arnott, viz., about three cubic feet per minute, such an apartment could not be considered a healthy sleeping-room for a single person. much less a safe dormitory for a whole family.

"In some of the lower wards of the city, the tenement-houses are much more densely crowded than in those just

mentioned. In one of them, containing from 120 to 150 families of three to ten persons each, there are but about forty feet of frontage and sunlight. In two of the smallest of those apartments, eight cases of malignant typhus have been seen at one time. And at the last visitation of cholera, the first cases of that malady occurred in that pent-up and overcrowded locality.

“Second, Small-pox, typhus fever, and every other pestilence find a genial and prolific soil in such crowded, unventilated structures as the habitations of the poor in our city, and from them the germs of fatal diseases are continually conveyed to the dwellings of the more favored classes.

“Third, The fashionable and gregarious custom of crowding our hotels and boarding-houses is becoming a hazardous practice, unless more attention is given to the hygienic condition and wants of such establishments—very few of which have hitherto been provided with any thing like systematic and efficient ventilation, or perfect drainage. The recent fearful endemic at the National Hotel, in the city of Washington, should teach an important practical lesson on this subject.

“Fourth, The drainage or sewerage, and the necessary measures for securing general cleanliness and a pure atmosphere, are not yet suitably provided for by law.

“Fifth, Architecture, in its applications to private residences as well as to public edifices, has not yet had primary or suitable reference to man's hygienic interests. Adaptations for a sufficient supply of pure air and sunlight have been sacrificed to architectural effect on the one hand, and to a mistaken economy on the other.

“The vital importance of a correct understanding and estimation of such considerations as the foregoing, must be manifest to all who intelligently investigate such subjects; and to the political economist, the merchant, and the moralist, these

topics are invested with relations quite as interesting as those that lead the physician and the philanthropist to study them."

Dr. Reid was one of the Commissioners appointed by Queen Victoria for inquiry into the state of large towns and populous districts ; and his opinions are founded on large experience

In Schools.—The greatest sufferers from the general ignorance of elementary physiology and hygiene among architects, controllers and teachers, are children in schools, both public and private ; the latter just now probably the more punished of the two. We need not repeat from the report of the Commissioners just mentioned, the distressing particulars of the wretched state of the cottage schools in the different parts of England, nor of the dame and public schools of Liverpool and Manchester some years ago. Abundant matter for comment and stricture is offered to observation in the schools of the United States. The fate of the school children of poor or improvident parents, who reside in narrow streets, courts, or alleys, is peculiarly hard ; for, after suffering from partial suffocation during the night and a part of the day in their own wretched homes, they are subjected to a similar, if not more injurious process in their school-rooms, into which they may be said to be entrapped, and thus cruelly treated under the show of kindness and regard for their welfare.

Of all the various edifices in which a number of persons are gathered together, and for whose protection and benefit an efficient system of ventilation is needful, none are of such paramount importance as school-houses, and none have been so generally, and we might add so cruelly neglected. The children who sit in them for many hours daily, require, above all other members of the community, a continued supply of fresh air for their healthy growth, and to allow of their tender brains being tasked without detriment and continual danger

to their intellects, and a depression of spirits and languor so opposed to their instinctive feelings and tendencies. The originally indolent boy becomes at school a hater of lessons and books, associating as he does with it all that is wearisome and dull; while the boy desirous to learn, and emulous of distinction, becomes exhausted by his brain-work, and his nervous system acquires a morbid sensibility which remains with him during all his after-life. The unrenewed air of a school-room soon becomes charged with the noxious exhalations both from the lungs and the skin. The latter organ, in a vast majority of the poorer children, and in not a few of the wealthier class, becomes, for want of due attention, almost coated with perspirable and other matters, and is a source of continual poisoning of the air of an ill-ventilated room. The architectural arrangement of nearly all the schools in England, as far as they were examined some years ago, was, with few exceptions, deplorably defective, especially where the scholars slept in the building. Among many instances of the same kind, we may state that, in Manchester, the blue-coat boys suffered from scurvy, which was removed in a great measure by an amended diet, and by ventilation of the dormitories after a fixed method. But it is not necessary to look abroad to find a general neglect of school hygiene, evidenced even in what all call first-class seminaries, as well as in those of less pretension and with humbler inmates.

In Hospitals.—All medical men must be aware, at the present time, how much the mortality is increased in hospitals and asylums of every kind by a confined air, rendered noxious by want of ventilation. The greatest skill on the part of the professional corps, the most attentive administration of well-selected medicines by intelligent and humane nurses, are nullified by the inmates of a hospital breathing an air not continually renewed, and which, if allowed to remain stationary, even for a very short period, becomes charged with emana-

tions, gaseous and animal, of the most deleterious kind. It is not too strong language to say, that a renewal of the air in hospitals, which implies adequate ventilation, is a question of life or death : every hospital in which the atmospheric air remains vitiated, so far from being a benefit to the poorer classes, becomes a public calamity. Better that its inmates should remain in their own wretched tenements, deprived of all medical attendance, than to be subjected to the concentrated poison of the large wards of a hospital. Many years ago, during a season of epidemic visitation of small-pox in Philadelphia, it was found that the mortality from this disease was greater among the inmates of the hospital at Bush Hill, of which your reporter was at the time the chief medical attendant, than among the sick in the city, many of them living in confined courts and dirty alleys, who came under his care as dispensary patients. As illustrative of the contrasted effects of crowding and bad ventilation on the one hand, and of improved ventilation on the other, reference may be made to the Lying-in Hospital, Dublin, in which there died 2,944 children out of 7,650 ; but after ventilation, the deaths, in the same period of time, and in a like number of children, amounted only to 279. The quantity and poisonous nature of the exhalations continually given out in the wards of a hospital occupied by the sick, are strikingly shown by Montfalcon and Polinière in a treatise on the Health of Great Cities,* when speaking of the *Hotel Dieu*, the great hospital at Lyons. The large fever wards of this building represent a cross, at the centre of which is a vestibule surmounted by a dome and a cupola ; in it is placed an altar of marble, over which is a smaller dome. From the wards thus communicating with the vestibule, the impure air and exhalations escape into the dome and cupola, which act as so many funnels, and thence through suitable openings they find exit into the outer air. The

* *Traité de la Salubrité dans les Grandes Villes, suivie de l'Hygiène de Lyon.*

amount of mephitic air accumulated in the dome and cupola, and afterwards expelled, is incredible, as no one could form the least idea of it when visiting the wards and breathing an air exempt from all bad smell in them. But if workmen at this very time ascend to the cupola, especially near its top, they will suffer so much from the close and foul air which has risen from below, as to be unable to continue their work, at the longest, for more than half an hour. Sometimes even after half an hour's delay in this infectious medium, they come away pale and oppressed, and so disordered that sometimes they sink down in a state of syncope. Many workmen are obliged to succeed one another, to perform the work of a single man.

In Work-shops and Factories.—The work-shops of persons engaged in various mechanical employments are for the most part exceedingly deficient on the score of ventilation, and their inmates in consequence encounter much suffering and disease. Dr. Southwood Smith relates many distressing details of this nature, which came under his own observation. There was a room in London, sixteen or eighteen yards long, and seven or eight yards wide, in which eighty working tailors sat, and so closely to each other, as to be nearly knee to knee; one witness told of his having known young men, tailors from the country, faint away in the shop from the excessive heat and closeness. It was of frequent occurrence in such work-shops, that suits of clothes of a light color were spoiled from the perspiration of the hand, and the dust and flue which arose during the work. In winter, these places are still more unhealthy, as the heat from the candles—it may now be said gas—and the closeness are much greater. The entrance of fresh air through an open window is objected to by those nearest to it on account of the draught, and generally they prevail in keeping out the cold—that is, the fresh air. The effects of continued exposure to this impure and deleterious

air, were to drive away many before their labors were over, and to take away the appetite of those unaccustomed to the place. "The natural effect of the depression," continues the witness before the Commissioners, "was that we had recourse to drink as a stimulant; gin being taken instead of food. I should say the greater part of the habit of drinking was produced by the state of the place of work, because when men work by themselves, or only two or three together, in cooler and less close places, there is scarcely any drinking between them."

Seamstresses, &c.—What has been said of the journeymen tailors, applies with too much force to the individuals of the other sex, who work in milliner and dressmaker shops, with the additional aggravation of their being sometimes kept up late at night to finish the dress promised by the employer for the next day. Even when working alone in their small and close rooms, from morn to night, in a half-bent posture, they are objects of deserved pity, as victims to the sin of a neglect of hygiene.

Printing Offices, in which germinate so many young Franklins, do not exhibit, if we may judge from the indifference of those who work within them, the shrewdness of their professed model, in either devising or availing themselves of known measures for the promotion of health, foremost of which is attention to the respiratory function. If it be true, as alleged, that pressmen are less liable than compositors to pulmonary consumption, we have additional confirmation of the fact, pointed out by Dr. Guy, of the greater frequency of this disease among those who are habitually exposed to a close and impure air, and especially if, at the same time, they are deprived of all exercise. The saving nature of this last is evinced under the circumstances just stated.

Nautical hygiene shows that outbreaks of cholera have occurred aboard ship from defective ventilation.

Pulmonary Diseases from Defective Ventilation.—It has been observed that, as a general rule, the frequency of pulmonary diseases in England is greater among the males than among the females, in the proportion of 100 to 94—as regards the country generally; but that in particular districts and towns, the greatest death-rates from these causes are on the side of the females. The difference is attributable to the confinement in factories or in shops, and even in their own houses, of this part of the population, while engaged in making textile or other fabrics. In three of the registration districts in which this difference prevails, a good proportion of the adult females are engaged in industrial manufacturing pursuits—these being chiefly conducted at their own homes. Exceptions, not yet explained, occur in this matter in some counties in England. We are, after all, safe in adopting the opinion expressed by Mr. Simon, namely: “In proportion as the male and female populations are severally attracted to indoor branches of industry, in such proportion, other things being equal, their respective death-rates by phthisis are increased.” In the lace-making districts, the female death-loss seems always to exceed the male. “The pulmonary death-rate is usually excessive in towns where both males and females are largely employed in the manufacture of textile fabrics; but the difference in the mortality of the sexes is rarely great.” So in Manchester, which, as one of the cotton manufacturing districts, has a high pulmonary mortality, the difference in the death-rates of males and females is slight; both being largely engaged in the industrial occupations of the place. In comparing this state of things with what occurs in Liverpool, we find that city, with a higher mortality still, does not show it so much in its female population, who are not engaged in any special employment.

Defect of Light.—Next to the apparent determination to exclude fresh air from the habitations of man, and from all the

places in which people assemble for the purposes of religious worship, business, and pleasure, is the apparent determination to prevent full access of light to the human body. The paramount importance of light to vegetation, so that through it plants acquire not only their verdure but the variegated colors which we admire in their flowers, as well as their requisite firmness of texture and the distinctive flavor of their juices, seems to have received only a passing application, suggestive of its producing analogous effects on animals. The bleaching and sickly character of vegetables, which follow the privation of solar light, and their sleep during the night, showing greatly diminished vital activity, find their parallels in the influence of the same cause on the animal economy. Comparative physiology furnishes additional proof in the same line of argument. When the eggs of a frog are put in water, in a vase with opaque sides and top, so as to exclude the light, they evince no change; whereas, eggs in water of the same quantity and temperature, exposed to the light, undergo a gradual development, and exhibit in due time young tadpoles. The subsequent transformation of these beings is not prevented, but it is retarded by their being kept in darkness. Edwards, who made these experiments, thought that in countries in which nudity was allowed by the nature of the climate, exposure of the whole surface of the body to light, or to insolation, as we may term it, was very favorable to good bodily conformation. Humbolt seems to incline to the same opinion. He asserted that deformity and deviations from the natural standard of symmetry are very rare in certain races of men, especially among those with a highly-tinted dermoid system. The sinister effects of want of the sun's light in underground apartments, and in houses, narrow alleys, and in deep courts, almost blocked out from its genial access, ought to share largely with humidity and impure air in the production of scrofula and scurvy, and must count its full share in the

etiology of anæmia and chlorosis, and of the pallid and earthy-colored skin of miners, and the tenants of prisons, as also of those persons who lead a sedentary life in ill-lighted habitations. Dr. Brown, of Chatham, near London, calls attention (*Sanitary Review*, April, 1858) to the injurious effects of underground kitchens. He would have large room for comment in some of our cities, especially New York, in which there are not only underground kitchens, but where also it is quite common to meet with dining, and sometimes sleeping-rooms thus situated. This vicious architectural arrangement is too common also in Philadelphia. Dampness is generally associated with the want of light, and performs a not unimportant part in causing disease, by withdrawing from the body, as Dr. Brown supposes, "its normal proportion of electricity, and thus occasions disorders that depend upon diminished nerve force. These are ague, neuralgia, certain forms of rheumatism, epilepsy, chorea, and asthma, with some other affections, such as dyspepsia." The servant girls of London exemplify, in their etiolated condition, and their breathlessness, as well as the anæmia under which they suffer, the evil effects of dampness and of deprivation of the solar rays. The functions peculiar to their sex are carried on imperfectly, or are absolutely suspended; hence the headache, the pains in the side, the palpitation, and the dropsical ankles so frequently witnessed in this class. Organic disease of the heart is originated by these causes in some instances. Another consideration stated by Dr. Brown, but not bearing on our present theme, is the exhaustion attendant on the frequent ascent and descent of stairs.

Dr. Elisha Harris, in his replies to the New York Committee, lays great stress on the privation of sunlight to a vast proportion of the population of the city, "not only in workshops, in warehouses, in counting-rooms, and in basements; but in the modern tenement-houses, the hotels, the school-

rooms, the churches, and the private dwellings." He adds, and with becoming warmth of language: "So important is light to human health, that it should be made a legal offense for any party to deprive a neighboring dwelling of light." He repeats an observation of Sir John Wylie, for many years physician to the Emperors Alexander and Nicholas, of Russia, viz.: that in a certain barrack at St. Petersburg, the mortality on the dark side, that from which sunlight was always excluded, was two hundred times greater than on that side on which the sun shone, and penetrated into the windows and doors of the apartments.

THE REMEDIES.—After a tolerably full notice of the impurity, and, still worse, the virulent properties and effects of the air, caused by overcrowding and defective ventilation, we are the better prepared to inquire into the means of the cure, and still better, because acting on a larger scale, the prevention of the evils described. The measures for meeting this object must be undertaken and carried out on a scale commensurate with the extent of the obstructions to be overcome. They require for their successful performance, discreet but firm legislation. First should be carried into effect the recommendation of the English commissioners already noticed, viz.: to empower the local and municipal administrative bodies, to raise money for the purchase of property, with a view of opening thoroughfares and widening streets, courts, and alleys, so as to improve the ventilation of the densely-crowded districts of towns, as well as to increase the general convenience of traffic. Practical suggestions in this line occur to us on learning the steps taken by the present Emperor of France, for the improvement and embellishment of Paris. There may be a difference of opinion respecting the motives which influence the French ruler in the great changes which have been brought about, and others still in progress and projected, in the interior of the capital; but

of one thing we may be well assured, that the public health will gain immensely, and this through the external ventilation procured by the new wide and magnificent streets, which intersect, and, in degree, break up the crowded dens of miserable tenements, in dark and narrow streets, occupied by a population ready at any hour to engage in scenes of public revolution or of local outbreak and bloodshed. With a view of securing better ventilation, the Commissioners farther recommended, that courts and alleys be not built of a less width than twenty feet, to be open at both ends; and that they have an opening of not less than ten feet from the ground upwards, at each end; the width of the court being in proportion to the height of the houses. Streets are not to be of less width than thirty feet.

Local acts, as authorized by acts of Parliament, have already been passed in Liverpool, Leeds, and London, and doubtless in other cities and towns, since our attention was last directed to this point, prohibiting the use of cellars in dwellings, unless they are so constructed as to provide protection against the existence of the evils which we have just pointed out. The Commissioners farther recommended that, after a limited period, the use of cellars as dwellings be prohibited, unless the rooms are of certain dimensions, and are provided with a fire-place, and window of sufficient size, made to open, and that said dwelling have an open space in front; and also, that the foundation be properly drained. Prohibitions have been suggested, if not laid down by actual enactment, against building houses back to back—a vicious practice, which effectually prevents both a deep supply of light, and any adequate ventilation by a through current of air through each house.

“The French Government has appropriated 10,000,000 francs to encourage the building of workmen’s dwellings. Many model cottages are now being erected in the neighbor-

hood of Paris; each is designed for four families, and each containing four rooms, is to be let at 150 francs a year. They are to be exclusively for laboring men and their families, and to be supplied with water and gas. One hundred and fifty more of these chalets are to be erected in and about Paris; and already 15,000 applications have been made for them to the Administration.

“At Mulhouse, a society had expended, up to the close of 1855, 900,000 francs, for a like object; the Government having contributed 150,000 francs.

“At Genoa, where the municipality expended 12,500,000 francs, during the last invasion of the Cholera, chiefly for the relief of those living in defective, unhealthy dwellings, a company has been formed to erect houses for workmen, in which the King of Sardinia has taken 150 shares.

“At Berlin, there is a Building Society, under the patronage of the Prince of Prussia, with a capital of 200,000 thalers, which yields 4 per cent. on the investment. It has now 202 occupied dwellings, and 27 work-shops.

“In Tuscany, the Grand Duke, in October, 1844, issued a decree, empowering all municipal magistrates within his territory, who may deem it expedient, to form a commission for providing the means of cleansing and rendering wholesome the dwellings actually let or occupied by any other person than the proprietor, which are in such a state as to be dangerous to the health of the occupants or community.

“There are also societies to improve the dwellings of the working men at Parma, Dresden, Brandenburg, Bremen, Chemnitz, Locle in Switzerland, and many other places.

“The houses erected are incomparably better than the ordinary dwellings for the same class; the rents are lower, with

the privilege generally to the tenants of becoming proprietors."^{*}

Model Houses.—After State and municipal governments shall have done their duty, by wise and liberal enactments, and providing means for giving them effect, a large field will still be left for the exercise of individual benevolence, or of voluntary associated effort, to carry on a series of auxiliary measures, which are necessary to the completion of those of a public and administrative nature. Among these it is pleasant to be able to announce, not merely the inception of plausible plans but their already successful execution, as in the erection of model-houses in town, and model-cottages in the country, for the use of the working classes in England. The new buildings, though small, are on a footing of comfort and sanitary arrangements, as to a due supply of water, warming, and ventilation, equal, if not superior, to larger mansions inhabited by the wealthy. The trials so far verify a remark made by the Rev. Mr. Girdlestone, who has taken an active and praiseworthy part in sanitary reform: "that one of the most efficacious means of elevating the condition of the laboring classes is the improvement of their dwellings." At Birkenhead, opposite Liverpool, dwellings have been erected in a style so neat as to approach to elegance, by the Dock Company, for the accommodation of the workmen employed in the construction of the docks and warehouses of that new and flourishing town. Tenements have also been erected at the same place by Mr. William Laird, called "Morpeth Buildings," and others by Mr. Robert Hughes; the former consisting of sixty-four, the latter of seventy dwellings. The first is built on the Scotch plan, in flats, or suites of rooms on a floor, and constitute eight blocks, each block consisting of eight dwellings. The blocks

* The Fourteenth Annual Report of the New York Association for Improving the Condition of the Poor, for the year 1857.

are four stories high, with no yard or cellar, and each flat is divided into two dwellings. Each dwelling consists of three rooms—kitchen, parlor, and bed-room, or two bed-rooms. The kitchen is provided with a range and oven. Separated from the kitchen, by a well-fitting door, is a water-closet, with an abundant supply of water for this and all other purposes. Through the centre of each block, from top to bottom, runs a square shaft, containing the water and gas-pipes belonging to the eight dwellings. A small iron door, about ten inches square, is fixed to one corner of a recess, close to the ground, through which all the dust and dirt are swept; the dust-shaft receives the dust from all the eight dwellings by eight similar openings, and descends to a very large dust cellar beneath the level of the house, from which it is removed at stated periods. Each house is ventilated by two air-bricks—that is, a space equal to the size of a brick is left open for the admission of air, covered within and without by an iron grating, and capable of being closed by an iron shutter, if necessary. One of these openings is placed near the ceiling, for the escape of vitiated or heated air. There is only one appliance, external to the person, wanting in these houses, viz.: the bath. In New York, tenements of this description have been constructed; and, where ground is so valuable, and the population so dense, in some of the worst districts, they must be regarded with favor, although they may allow of but comparatively limited external ventilation.

Model lodging-houses have likewise been built in London and other places with the most satisfactory results. The houseless, the destitute, and the very poor are comfortably lodged, at the same time that they escape the contamination both of disease and vice, for a very small sum, but which is remunerative to the proprietor. At a meeting, some years back, of the "*Society for Improving the Condition of the Working Classes*," Prince Albert presiding, it was stated by

Lord Ashley, that the new lodging-houses gave nightly lodging, with every accommodation for cleanliness and decency, at the rate of four pence (eight cents) a night ; so entire was the success and so remunerative was the profit obtained, that upon a sum of about 13,000 or 14,000 pounds sterling (65,000 to 70,000 dollars) expended on these lodging-houses, they were now receiving an income of very nearly 1500 pounds, or (7500 dollars) a year. Great improvements have been brought about in common lodging-houses throughout the kingdom by Lord Graftonbury's act, as it is called.

With such examples of successful sanitary reform before them, the people of the city of New York need not hesitate day before entering on a similar course, and thus regain high health-rate which it once enjoyed, realizing the benefits due to its naturally favorable situation, and to certain hygienic measures which have been completed on a large scale at great cost. In the words of the Committee of Investigation of the health department of the city of New York, we can say : "A healthful river flows beneath its streets and avenues, supplying every habitation with sufficient water to allay thirst, to prepare food, and to promote cleanliness. The island on which it stands is laved by two noble rivers, whose tides uplift and cleanse the respective streams. Its sewerage is advancing with rapid stretches from street to street, and the fresh breezes from the ocean temper the coldness and moderate the heat of its climate."

MEANS OF VENTILATION.—When persons speak of the necessity of fresh air for health, they are not always aware of the various purposes which it serves in the animal economy. It is a "thing," a substance to be weighed and measured as we would water. It is a food, the introduction of which into the lungs is more necessary than that of the substances commonly reckoned as food which are introduced into the stomach. The call for the aerial food is incessant, allows of no pause,

that for the solid and liquid food is periodical and allows of postponement for many hours. Using the terse language of a recent writer, when speaking of the air: "It affords mechanical support; it is a heat-modifying medium; it swallows all gases exposed to it; it supplies a food to man, out of which he is in part built up; it feeds him with the active principle by which the warmth of his body is sustained. The chief sustaining element of the air inspired in breathing, is the oxygen, which forms a fifth part of the whole of the atmospheric sea." The minute terminations of the branches of the bronchiæ, themselves ramifying from the windpipe, and called air-cells, amount to about six hundred millions. The air in these cells, and chiefly its oxygenous portion, permeates their sides and enters those of the minute blood-vessels, which are ramified over them, and thus finds entrance into the blood with which it mixes, and which it so changes as to fit this vital fluid for the nutrition and building up of the new and assisting to remove the old materials of the organs. While the blood is thus changed by the introduction of oxygen, it gives off, at the same time, its gaseous refuse in the form of carbonic acid and animal exhalations. There is no tampering with the respiratory wants: the lungs must have their due supply of pure air, or the entire animal organism suffers—the lungs suffer, the heart suffers, the brain suffers, and the mind works slowly; the stomach is weakened in its functions; muscular movement is enfeebled; the senses are dull; the natural color of health is replaced by pallor. The movements of inspiration and expiration, which make up respiration, constitute the natural ventilation of the living frame. This living ventilation is carried on unceasingly from birth to death, by the infant as well as by the adult, by the profoundest philosopher as well as the solitary artisan in his close polluted atmosphere, or by the sailor nursed amid storms, in a pure and invigorating air. Whether the circumambient air be pure or

pestilential, we drink of it twenty times a minute; if of the latter kind, we look old in our youth; if of the former, we maintain the appearance of youth in old age. The average chance of living to the proverbial age of threescore years and ten may be considered the measure of the purity of the air we breathe.*

Different Modes.—All the different modes for ventilation are reducible to three heads: 1. To ventilate by heat, or by a chemical process. 2. By pumping, or a mechanical process. 3. By the pressure and movements of the atmosphere without let or hindrance.† Dr. Reid, both in his work before mentioned and in his Report to the Commissioners on the Northern Coal Mine Districts, enters fully into this interesting question, which he presents under the following aspect: "Ventilation depends essentially on three conditions: the quality of the external air; the quantity that can be made to flow through it in a given time, including the mode of distribution and the regulation of which it is susceptible, whether in regard to the temperature communicated to it, or the force with which it impinges on the system; and its freedom from any noxious ingredients that may be developed by lamps, candles, fire-places, or by any other special cause. Where sanitary measures have secured the purity of the external atmosphere by effective drainage, cleansing, and prevention of nuisances, one-half of the remedy may be secured, and without such measures no system of ventilation can be successful." "Were it generally known," writes Dr. Reid, "that the movement from an ascending current from lamps is always accompanied in non-ventilated apartments by a proportionate descent of vitiated air, which may have previously supported combustion, and that the descent, though limited at first,

* Dr. Hutchinson. Jour. of Pub. Health, vol I.

† Sanitary Review, vol. II. p. 208.

may suddenly reach the floor, greater anxiety would be manifested to give vent to such products by a superior aperture." Dr. Guy very justly remarks that no system of ventilation can come into general use which does not prevent draughts, which is not cheap, and which interferes to any great extent with existing structural arrangements.

The great number of plans for ventilation would imply that an easy and efficient system is not yet reached. They are, however, encouraging, as they afford evidence of an increasing desire to become acquainted with the subject, and to give it a practical bearing. The extension to which this report has already unexpectedly reached, will forbid my entering into details, or even repeating the outlines of all the different plans which I gave some years back (1850), in a report on Public Hygiene, read before the College of Physicians of Philadelphia.

Beginning with the third head of the plans of ventilation, which looks to the natural movements of the air by a simple interchange between that of the interior of a house or other building, and the external atmosphere, Dr. Reid thinks, that a well-constructed window, capable of being opened above and below, realizes, when the fire-place is well arranged, all the essential conditions for effective ventilation, in the apartments or tenements occupied by the poorer classes. This, as he admits, however, will only answer when the weather is not severe. It also assumes, what in our towns now is becoming a rare thing, viz. : an open fire-place. This last is replaced by a stove, or more generally still, by a register for the admission of warm air from the air-chamber heated by the furnace below.

One of the simplest, and at the same time a most gentle and efficient mode of ventilation, is the admission of external air through a perforated zinc plate, or fine wire gauze, which is to replace a pane of glass in a window of the room to be ventilated. The plate is perforated with 290 holes to the

square inch. It, or the gauze wire, is generally introduced in the upper part of the window, and in the place of the corner pane the farthest from the fire-place. Instead of the contrivances just mentioned, the pane of glass might itself be perforated. The fine orifices prevent the air from coming in with a rush, which would occasion discomfort, and they tend to diffuse the air equally and gently through the apartment. No draught is felt unless a person be seated immediately under the window. But the benefit is not limited to the introduction of pure atmospheric air into the room. There is, all the time, an interchange between it and the internal heated and impure air, which thus finds vent and is carried off. The interchange takes place on the same principle with the diffusion of vapors and gases, even though they differ from each other in temperature and specific gravity. It is in this way that Jeffray's respirator acts, by mitigating the coldness of the external air in its admixture with the warm internal air, just escaping from the lungs in respiration. The plan of ventilation now described is recommended by its simplicity and its cheapness. It is applicable to ordinary sleeping and sitting-rooms, in a private house, as well as to shops, in which, owing to the general absence of an open chimney, or any other means of permanent communication with the external air, it is more urgently required. During the first winter in which your reporter had charge of the men's wards of the Commercial Hospital at Cincinnati, he caused gauze wire to be substituted for a pane of glass, in every other window, and the effects were immediate and perceptible, both in a diminution, if not entire exclusion, of the unpleasant odors which pervaded the wards, the ceilings of which were very low, and which were heated by large coal stoves in the centre of each ward. On the following winter, the gauze wire was substituted for the pane of glass in the other windows of the large ward, and with the best effects. At the conclusion of his first

tour of duty in the spring, his colleagues in the Ohio Medical College were pleased to compliment him on what they termed his successful practice in the Hospital. As statistical returns were wanting, one could not attach much importance to this favorable opinion; but if the patients could have spoken, they would have expressed themselves in very decided terms of commendation of the plan by which they could breathe with some comfort, especially during the night, and obtain, at the same time, alleviation from the excitement and pains of fever and inflammation.

Another plan of ventilation still, based on the natural movements of the air, without the aid either of mechanical or chemical means, is by an opening in the wall or ceiling which leads to the external air, and which is protected by a shield or disk, say two inches larger than the aperture. The external air, in impinging against the side of this shield, is split up into a thin circular radiating sheet, and at a short distance below, not more than two feet, a person cannot feel cold entering, nor can the hand detect a draught at eight or ten inches distance from the edge of the disk. The sheet of air may be modified according to the distance of the shield from the aperture. A still farther precaution has been used by Dr. Guy, who adopted this practice for admitting air, through a window-pane of glass. It is to have the sides of a close-fitting shield perforated, and thus to have the air broken into jets. The plan of ventilation through openings with shields or disks before them, has been modified by Mr. Leather, of Sheffield. He introduced it for supplying the day and bedrooms of the Eccleshall Bierlow Union Poor House with fresh air, and, as he said, in his evidence before the English Commissioners for Inquiry, &c., so often referred to in this report, it answers the purpose admirably. An opening is to be made in the outer wall, and a flue carried from it between the floor timbers, to the middle of the ceiling, where the air passes

into the room ; in order to prevent the current of air from rushing downwards, the aperture in the ceiling is masked by a large circular iron plate. The purpose of this has been already explained. It is fixed on a screw passing through its centre, and by turning the plate round, the aperture may be closed or opened, little or much, and the supply of air regulated at pleasure. Mr. Hosking, in his valuable work on the "*Proper Regulation of Buildings in Towns*," suggests different plans for ventilation. One of the simplest, and which comes under our present head, is by means of "opposite air-flues, or flues opening to the same apartment, in opposite walls, the flue on one side giving vent to the spent air at the highest level the room affords, and that on the other side delivering fresh air at the same high level." This plan will go far to fulfill the indications previously stated by Mr. H., viz. : the expulsion of foul air from apartments by processes which act independently, and which cannot operate offensively, as by cold draughts ; and such processes must be moreover inexpensive, to give them any chance of being largely adopted. The plan just offered will be more complete where there is a fire, whose place is arranged, and whose combustion is fed with air, in a manner previously described by Mr. Hosking, so as to insure its own immunity from ignorant interference, while it requires no manipulation that a child may not supply. For the details of his plan, by which the fresh air from without is introduced behind and about the range or stove, and made to do the double duty of feeding the fire and supplying the room for the purposes of respiration, I must refer those curious on the subject to the work itself. The plan is very analogous to the one recommended long before by Franklin. The air-syphon ventilator originating with Dr. Chowne, is recommended by its simplicity and easy use, and its adaptation to the general ventilation of buildings, of ships, and of mines ; and if a little care were taken in pro-

viding for its application in architectural designs, many useful results, both in regard to artistic display and hygienic comforts, would be realized. The general principle of the air-syphon ventilator rests on the curious fact, that if a tube of the syphon shape be placed in a room with the long end uppermost, a current of air will immediately play through it, in the downward direction of the short, and in the upward direction of the long, leg of the tube. Another and still more simple process of ventilation is that recommended by Dr. Corwan. It consists in simply bisecting all tubes or outlets by which a current of air is desirable. The bisecting consists in the introduction of a second tube within the first, so as to allow space between the two. If smoke is to ascend, it will be drawn up in a steady and rapid stream on one or other side of the septum, and a downward current more or less active will be established in the other. "Smoky chimneys, for example, with their legionary train of evils and inconveniences, would be impossible, were their spaces properly subdivided; for no disproportion in the relative strength of either upward or downward currents would prevent their independent establishment. The short and ever-smoking chimneys of small tenements and upper chambers might thus be made efficient; and in cases where bisecting the tube was impracticable, suspending a central tube would probably succeed. The pipings of stoves, if so constructed, would be far more certain in their action, while the downward draught could be easily converted into an efficient bellows for the fire." Mr. McKennell, of Glasgow, has constructed his patent ventilator on this system. "It consists mainly of air-tubes arranged concentrically, the inner discharging the vitiated air, while the fresh supply flows down the outer tube. It is almost automatic in its action, requiring little or no attention in ordinary circumstances. It removes the air as it is vitiated, and supplies its place with pure air in the exact amount required, in currents so gentle as to be scarcely perceptible."

Mr. Robertson describes the mode of ventilation of the hospital at Bordeaux, which is on the same principle as that advocated by Mr. Hosking. It consists in having isolated wards, and these open to the air, from side to side and from end to end, by means of long windows, so that a current of air is always passing through, in correspondence with the natural laws of the atmosphere. In carrying out this, the natural plan of ventilation, the perforated zinc or glass plates are most useful.

Under the head of mechanical or physical means of ventilation, come wind-sails, chiefly used on board ship, the bellows or pump, the fan and the screw. The fanner and screw may be looked upon as modifications of the same instrument. All these mechanical plans are described by Dr. Hutchinson, in the *Journal of Public Health*, vol. ii. In this connection, reference may be made to Dr. Arnott's single ventilating pump, his gasometer ventilating machine—in fact, an air-pump—also his double-current warming ventilation. In the Niger expedition, the steamers were ventilated after a plan proposed by Dr. Reid, which rested in the plenum and vacuum principles. A fanner or ventilating machine was put in motion either by the machinery of the steam-engine, or by the “kroomen,” or when in the rivers, the paddles being disconnected from the engine, by the paddles themselves, which acted as water-wheels. From the ventilator a series of tubes extended to all the compartments of the vessel. When the fanner worked on the “*vacuum principle*,” the vitiated air was drawn by it from the various compartments, and was discharged at an opening in the circumference of the fan-box. When the “*plenum principle*” was resorted to, the fresh external air was connected with the centre, and blown into the distribution tubes to the several compartments. By these means it was hoped that, under any circumstances, fresh air might be infused into, or vitiated air extracted from, the hold,

or any part of the vessel. At some periods of the voyage, the air was drawn through a medicator, with the intention of removing carbonic acid, and of evolving chlorine.

Chemical Ventilation.—For nearly all useful purposes, and as an agent, in some sort, always present, and readily brought into play, heat is the most efficient agent, and it is that which gives rise to *chemical ventilation*. In fact, the questions of warming and ventilating apartments are closely related and interwoven one with another. There can be no ventilation where there is no movement of air, and this movement, apart from some mechanical contrivances of very limited use and power, is always imparted by heat; one portion of air rarefied by heat, rising and being replaced by a cooler one, and so on. As long as we have a fire we have a ventilator; and when the difference between the temperature of a room or hall of any description, and that of the outer air, is not enough to cause an active movement of the air, or where this is mixed with much watery vapor or gases, it is necessary to procure the aid of artificial heat, or a fire, in order to give the requisite movement to the air, and thus insure ventilation. With this view a fire is made in the upper part of the tower of a building to be ventilated, and flues are constructed to establish a communication between the room or hall in which persons are assembled, and the chimney of the fire-place, or a common central flue contiguous to and heated by this fire. A few large gas-burners will answer the purpose of this last, and with less trouble to the attendants, and less risk to the building. The impure air is by this means drawn, as it were, from the various rooms below, through the prepared apertures at the upper part, or near the ceiling, and passes along the flues which converge at the central flue, whence it finds its way into the open air, at such a height, and with such a rapidity of movement, as to insure its diffusion through the atmo-

sphere, without its exerting any injurious effects on the people out of doors, or, in fact, without the possibility of its reaching them. By methods of this kind, we could ventilate all places in which people congregate for any length of time, as churches, schools, and lecture-rooms, courts of justice, concert, and dancing-rooms, and theatres, or in which a number of persons are confined from infirmity or sickness, as in hospitals and other asylums, or for crimes, as in prisons. The ingress air, or that from without, is to be introduced in quantity bearing a relation to the number of persons assembled, and to the quantity of egress air through the discharging flues. When, however, it is necessary to procure artificial warmth for the comfort of the parties assembled, in any of the ways just mentioned, then the heating apparatus will rarefy the air sufficiently to insure, after it has been used in respiration, its rising and being carried off by exit flues opening into the external atmosphere. These flues for egress air should be somewhat of a valvular form, because air, except under a powerful and quick motion, will, from any cause, regurgitate into the apartment or hall. By the *internal valve for egress air*, we must be understood to mean some valvular machine opening into a heated chimney-flue, which may pass up the side of the chamber. The internal valve is, therefore, chiefly applicable to private rooms or buildings constructed on a similar system. More than sixty years ago, Franklin spoke of the advantageous system of making a communication into a smoke-flue near the ceiling of the wards of the Pennsylvania Hospital, and that such an opening, together with another in each door of the ward, made them all "perfectly sweet."

The ventilating valve of Dr. Arnott has got into extensive use, and when correctly fitted up, works well. It is placed in an opening made for the purpose from the room into the chimney-flue, near the ceiling, by which all the noxious air, caused by the breathing of persons in the room, the combus-

tion of gas or other bodies for lighting, &c., is allowed at once, in obedience to the chimney draught, to pass away; but through which no air or smoke can return. The valve is a metallic flap to close the opening, balanced by a weight on an arm behind the hinge. The weight may be screwed on its arm to such a distance from the axis, or centre of motion, that it shall exactly counterpoise the flap; but if a little farther off, it will just preponderate, and keep the flap, when not acted on by entering air, very softly in the closed position. Although the valve, therefore, be heavy and durable, a breath of air suffices to remove it; which, if from the room, opens it, and if from the chimney closes it, and when no such force interferes, it shuts. The valve is so regulated originally, as to settle always in the closed position. An important part of the arrangement is the wire, which descends like a bell-wire, from a valve to a screw or peg fixed in the wall within the reach of a person's hand, by acting on which the valve may be either entirely closed, or left free to open in any desired degree. In cold weather, or with few persons in the room, the valve, when only opened a little, allows as much air to pass as is requisite. A flap of thirty-six square inches area is large enough where there is a good chimney draught, for a full-sized sitting-room with company. It is essential for the successful working of this ventilating valve, that the chimney draught be uniform and good, so that no more air shall enter at the chimney-flue over the fire, than can escape at the chimney-pot above. Where the room is warmed by a stove or by furnace, there is less probability of any obstacle of this kind to the chimney taking in air at the ventilating valve.

Mr. Ewart has constructed a more simple, and it is alleged, effective valve, than Dr. Arnott, for the small cost of a sum not exceeding a dollar. The valve is composed of oiled silk, on a frame, on which are six large openings, admitting the egress of air with great freedom. Very similar to this con-

trivance, is one also suggested by Dr. Arnott. It consists of a square iron tube of from three to six inches in diameter, and so long that the outer orifice shall be flush with the wall of the apartment, and the inner one enter the chimney. These tubes are usually from four to six inches in length. At the orifice entering the room, there is either a plate of perforated zinc or a piece of fine wire-work, from the upper and back part of which hangs a piece of ordinary or oiled silk, which acts as a valve, so as to allow the warm and vitiated air to pass up the chimney, and to prevent any smoke from entering the room. The annoyance of a smoky chimney is removed by this mechanism. When it is found necessary to close up the valve, either upon lighting the fire, or in cold weather, or when a room is first inhabited, or finally, if the chimney should be on fire, a slide connected with the tube can be drawn up and cover the whole aperture.

In constructing a house, Dr. Hutchinson recommends the introduction of a sufficient flue for air. All chambers should receive the air below the level of the head of the inhabitant, and this air should be carried away at the highest point of the chamber, in the ceiling or immediately below it. This direction is not applicable to the flues through which heated ingress air from furnaces, or analogous heating apparatus by steam or hot water below, finds its entrance into a room. Its diffusion takes place without difficulty. Supposing, as is the case in summer, that no movement is communicated to the air by internal heat, and no external supply is obtained by heated air which had just come from the external atmosphere, then must the ingress air be low down; and while entering it should be dispersed or broken up into small streams or thin sheets, as previously recommended, so that no draught can be felt by the inmate of the chamber. It is necessary that the air should be admitted imperceptibly, and thus receive the natural radiant heat of the chamber as quickly as possible.

Perforated floors were adopted by Dr. Reid, in the House of Commons; this again being covered by hair cloth, so that the supply of air be broken up into small currents. The objections to this arrangement were found to be, that the air not only brought with it all the dust and dirt and taint from the feet, but it was likewise directed upon this part of the body, thus increasing the discomfort of "cold feet," from which many persons suffer. In large buildings, as churches, where there is generally underground convenience for directing the air through some favorable quarter below the floor, into the body of the building, and that in particular spots, not near the feet, as in the aisle, this system of perforated floors may be found to answer. In private rooms, there remains only the side-wall for ingress air, and the place recommended in preference, is the top of the skirting board which surrounds the room. But even here some of the objections occur which intervene with the plan of perforated floors, viz., the escape of dust which would adhere to the borders of the slit, if not partially obstruct it, and be impelled at other times into the room by the draught of the ingress air. This latter may be broken into a sheet-like form by other means, which have been already mentioned. Corresponding with the passage round the lower part of the room for ingress air, and free from the objections brought against this, is another passage for the egress air made by openings just below the cornice, which communicate with the external air, and are wide enough to answer the desired purpose without interfering with the ornamental character of the cornice, or the general style of the finest apartment.

Among the latest and most valuable for efficiency and general applicability, is the plan of ventilation of dwellings and other edifices, suggested and put in execution by Dr. J. H. Griscom, of New York. It pertains to the "chemical method," the motive power of the air being heat, but requiring no ex-

tra expenditure of fuel, the heat used for the purpose being only the waste heat of the furnace by which the house is warmed. The arrangement consists in the construction of independent ventilating flues in the walls of the house, in proximity to the hot-air tubes, so that the two may be connected together by means of a lateral or branch tube, by which a current of hot air may, at any desired moment, be transmitted from the hot-air tube to the ventilating flue. By this means the ventilating flues, which terminate in the open air like an ordinary chimney, will be warmed by the hot air from the furnace, when the ordinary hot-air register is closed, as at night in a dwelling, or in a school-house after school hours.

If properly constructed, of brick, or smooth stone, the walls of a flue will, after a current of hot air has passed through it a short time, become sufficiently heated to rarefy the air within, thus giving the flue a good ventilating power, even after the current of hot air has been withdrawn. For example, if the hot-air register of a parlor be closed at ten o'clock at night, and the heat, instead of being thrown back into the furnace, is allowed to pass through the lateral tube into the ventilating flue, and so continue till six the next morning, it is evident that, during those eight hours, the interior of the ventilating flue must become thoroughly heated, so that the next day, when the current of hot air is restored to the parlor, the heated sides of the ventilating flue will continue to rarefy the air within them for many hours, and perhaps even days, afterwards.

There being no danger of a reaction of the air of the flue through the ventilating register (as is the case when ventilating openings are made in ordinary fire-flues), connections with the apartment to be ventilated may be made at any point, and even carried to the opposite side of the house, between the beams of the ceiling, to ventilate distant apartments. Dr.

Griscom's method has the advantage of being applicable to all edifices warmed by hot-air furnaces of any description, which, in general, are those most needing ventilation. This arrangement may be introduced into many houses already erected, by connecting the hot-air tubes with such of the ordinary chimney-flues as are not used with fire.

One of the principal advantages appertaining to this plan, is the capability of having a *large number* of ventilating flues put in connection with the furnace. In fact, the number may correspond with the number of hot-air registers, and thus any desirable amount and extent of ventilation be obtained.

Ventilation of Schools.—Happily we can now speak of a marked reform in this matter, which began in Boston, and promises to spread to other and remote places. A committee, consisting of Dr. Henry G. Clark, E. G. Loring, Esq., and the Rev. Charles Brooks, under an appointment of the School Committee of Boston, to inquire into the subject of the ventilation of school-houses, and to indicate the means of remedying defects, reported, after the successful performance of their task, that the grammar school-houses were then in a better condition, in respect to their ventilation, than any other public schools in the world. The first-named gentleman of the Committee, who is our colleague on the present occasion, was mainly instrumental by his ingenuity and perseverance, in bringing about these improvements. In Philadelphia and other cities, many of the public schools received the benefit of the visits and reformatory suggestions of the Boston Committee. Statues have been reared, and other honors conferred, for much less services than were rendered by these gentlemen. They ought to have received at least an ovation from the grateful children and teachers in the public schools. Commendatory reference may be made at this time to the very useful volume of Mr. Henry Barnard on School Architecture in the United States. From

page 142 to page 165, 2d edition, the reader will find instructive details on the subject of warming and ventilating schools and other public buildings. Among the apparatus for the purpose, Chilson's furnace and ventilating stove, and also Emerson's ejecting and injecting ventilators, are noticed in terms of commendation, such as had been previously bestowed on them by the Committee. Mr. Emerson very properly insists on the admission of warm air into a school-room, as indispensable to its proper ventilation; and he enforces his views on this point, by refusing to allow his ventilators to be put up in any school-house that is not, by some means, supplied with fresh warmed air. He objects, like most people who have attended to the subject, to the use of all such stoves and furnaces as emit their heat through and from *red-hot* iron; and he recommends what large experience sanctions, that when anthracite coal is used, the stove or furnace in which it is burned be lined with brick or stone.

The great and crying neglect of external ventilation in nearly all the schools, both public and private, in cities, tells heavily on the health of their inmates. No adequate, and in most cases, no space at all is allowed for the children to obtain fresh air, and to engage in healthful exercise and sports during the hours of recess from study. Not only are out-door exercises imperatively demanded for the purposes of full respiratory effect by expansion of the chest, but also of allowing the body to receive its erect posture, and the limbs their free play, all of which is prevented when the children are seated, and leaning over a table or desk.

Ventilation of Hospitals.—It has been well remarked by the French authors (MM. Montfalcon and Polinière) of a work already cited—a Treatise on the Health of Great Cities—that the more numerous and diversified are the causes of vitiated air in a hospital, the greater is the neces-

sity for vigilance in obviating its occurrence. Every patient ought, these gentlemen think, to have at least three hundred cubic inches of pure air per hour at his disposal; and every ward of a hospital so well ventilated, that the most delicate sense of smell could not detect any unpleasant odor; and finally, the temperature should be always kept at 60° F. Ameliorating influences, to the extent, in some instances, of entire reform of old abuses, are now at work in the ventilation of hospitals and benevolent and charitable asylums of all kinds. This is more particularly observable in the asylums for the insane, some valuable suggestions and improvements in the interior economy of which have been made of late years by their medical superintendents. At their meeting in Utica, in 1849, they declared it to be their unanimous opinion, "that the experiments recently made in various institutions in this country and elsewhere, prove that the best means of supplying warmth in winter, at present known to them, consist in passing fresh air from the external atmosphere over pipes or plates, containing steam at a low pressure, or water, the temperature of which in the boiler does not exceed 212° F., and placed in large air-chambers in the basement or cellar of the building to be heated." These gentlemen also declared "that a complete system of fixed ventilation was absolutely indispensable in every institution, like hospitals, for the ordinary sick or insane, and where all possible benefits are sought to be derived from these arrangements; and, "that no expense that is required to effect these objects thoroughly, can be deemed either misplaced or injudicious."

The union of mechanical with chemical means of ventilation of hospitals has been recommended. A small power would be sufficient to abstract the air rendered heavy by the carbonic acid, which is accidentally diffused in consequence of being condensed before it arrives at the ventilating tubes. This might be done by means of a ventilator on the bellows

plan, similar to that adopted by Hales, or the still more simple one, the exhausting air-pump of John Taylor, for the ventilation of coal mines, which is worked by a regulated power on the principle of clock-work, and with the addition of an apparatus for opening the valves. "The expense of labor to raise a weight every day to keep it in constant action, would be," Tredgold thinks, "much less than the expense of fuel and attention to produce the same effect by fire, the action being more certain. To produce the effect we desire, the best plan seems to be to have open gratings in various parts of the passages, with tubes from each to the place of the ventilator; and the gratings might be provided with slides, so that the action might be confined more to particular parts, as occasion might require." Another important part of the ventilation of hospitals is that of the water-closets. An effectual plan for attaining this end is to connect a flue at one end with the descending pipe of the basin, or with the well below, and at another end with the chimney of a fire that is constantly kept up. Even where the water-closet pipe empties into a cess-pool privy below, this arrangement is, as we know from actual experience during a period of seventeen years, quite successful; even in a case in which, although water is introduced by a pipe and stop-cock into the basin of the water-closet, yet there is no addition of a trap or syphon. It is necessary for the proper effect of this plan, that the lids of the privy below be kept down, otherwise there will be an upward and offensive current of air from the cess-pool, interfering with the draft from this into the chimney, as just described

At this present time two novel systems of warming and ventilation seem to divide scientific opinion and support in Paris. The one is by M. Duvoir, the advantages of which are said to be: 1st. That it insures free ventilation; 2d. That it warms and ventilates at the same time; 3d. That it is cleanly and inexpensive; 4th. That in hospital wards, where the emana-

tions from the sick are offensive and pernicious, such emanations can be borne away, directly from above downwards, by having the upper opening in the ventilating shafts in each ward closed, and the lower one open. The wards are thus constantly swept clean of all hurtful gaseous products. Among other public buildings is the "*Hospital de Lariboisière*," to which the system of M. Duvoir has been applied. Strong testimony is borne by distinguished judges of the value of its action and of its successful application.* The second apparatus for warming and ventilation, is that contrived by Van Hecke. The apparatus for heating the men's wards at the Neckar Hospital, consists of three furnaces in a cellar, which heat air that is distributed by flues to the hospital. The quantity of air heated is considerable, and hence it need not be raised to a high temperature: this, when entering the wards, is not more than 86° to 95° Fah. It acquires the proper humidity by passing over contiguous reservoirs of water. The ventilation is procured by the agency of a small steam-engine placed in the cellar, but its boiler in a suitable place outside the building, which sets in motion a ventilator, that derives its pure air from the garden, and injects it into a strong suction-pipe placed under ground, and running the length of the entire building. This chief pipe is divided into secondary ones, which convey the air to the furnaces, and thence into the wards situated on different stories. The air enters into the wards in large sections, and without producing sensible currents. The impure and vitiated air escapes by flues, which convey it out above the roof. This system may be defined to be, warming the hospital wards by means of three furnaces; mechanical ventilation by propulsion; complete appropriation of the steam vapor, which, after doing its first duty in the engine, is employed to meet the necessary wants of the patients, such as baths and washing. The ven-

* Sanitary Review, vol. I. pp. 428-4.

tilating apparatus propels from sixty to one hundred and twenty cubic inches of pure air hourly for each bed. Registers allow of the diminution of the amount of warm air brought by the different flues.

Factory Ventilation.—Were we to speak of the bodily ills from factory labor, as arising in part from defective ventilation, we should be met by the counter opinions of Drs. Ure, Thackrah, and W. Cooke Taylor, in England, and MM. Villermé, and Benoisten-Chateaucuf, in France. Dr. Ure contends that, from the very nature of the machinery used in cotton mills, it is impossible to crowd the operatives, and especially those, nine-tenths of them children, who tend the open-spurred mules. As respects the growth and development of persons engaged in factory employments, Sir David Barry, in his Factory Commission Report, relates, as the results of personal observation, that many of the girls were beautifully formed, who had been from ten years to maturity in the mills. On the subject of ventilation, M. Villermé states distinctly, after a careful calculation of data, that the great body of those employed in the cotton mills have a better supply of air at their work than at their homes, and better, also, than great numbers of other classes of work-people. Dr. W. Cooke Taylor says: "I would be very well contented to have as large a proportion of room and air in my own study, as a cotton spinner in any of the mills in Lancashire!" We must look then, it would seem, for the causes of the greater proportionate mortality among the manufacturing than among the agricultural population, to the confined lodgings and crowding in the parts of the town in which the former sleep and spend the time not given to work, and to the want of abundant nutriment, and also in a large number, to habits of intemperance. There are, however, some facts recorded which might serve to qualify the favorable opinions of factory life. Thus, for instance, fewer recruits of the proper strength

and stature for military service are obtainable now than heretofore from Manchester. Again: a corps levied from the agricultural districts in Wales, or the northern counties of England, will last longer than one recruited from the manufacturing towns, as from Birmingham and Manchester, or near the metropolis.

All classes might turn to useful account, for the purposes of ventilating both the rooms in their own houses and the larger ones in public buildings, the presence of artificial lights, especially those furnished by gas. A truncated cone of zinc, the upper part of which is narrower than that of an ordinary gas-shade, and resting, like the latter, over the burner, will be perforated near its upper border by one end of a tube of zinc, which will at the other end be carried through the outer wall, or else into a chimney, and thus be a conductor for the air of the room rendered impure by the combustion of the gas and the breathing of persons in the room. This mode of ventilation is particularly called for in small rooms or shops in which the air soon becomes contaminated, and exerts a noxious effect on those employed in them. There is one instance of an exit tube for gas, so elegant that it would grace any drawing-room, applicable for the lights over the mantel-piece at each side of the looking-glass, introduced by Prof. Faraday.

Dr. Hutchinson makes an observation which will be consoling to those of us who encroach on the midnight hour while engaged in the labors of the desk. "It is an error," he tells us, "to suppose that gas is more injurious to the constitution than candles; scientifically the common means of lighting, whether by candles, oil, or camphene, are all gas-lights. The work of a gas company is to take from the coal a certain product, and send it to our houses for combustion; when we burn the candle, &c., &c., we do in the sitting-room the work of the gas company, taking from the material the same product which the gas company sends to us in pipes;

therefore, if there is any difference, it is in favor of gas-lights."

Ventilation of Sewers.—This is done, first, by air-shafts, and gratings over them, at certain distances from each other, which permit the escape of the emanations from the sewer below into the atmosphere; 2d, by establishing a communication between the sewers and the rain-water spouts of the houses; but it is necessary to trap these latter, for, otherwise, they might allow of the escape of the foul air into the windows of sleeping-rooms. A common method in Paris is to allow of the escape of the foul air of the sewer through lofty shafts or chimneys, so that it shall be disseminated at a height which would prevent its annoying the people in the streets, and the inhabitants of houses of ordinary elevation. These shafts are placed, as much as possible, in the least frequented parts of the city; but even then the air escaping from them is a source of more or less annoyance. Sometimes fires are made in these chimneys, and thus a strong upward draft is procured, and a large amount of gases extracted. A simpler and more economical plan, is to connect the sewers with the furnaces or chimneys in large manufactories. The only drawback to a measure of this kind is the occasional risk of sewer gases exploding when subjected to flame.

As ventilation is a means of purification of sewers, a remark may be here made opportunely, that water is the best purifier, by its diluting the sewage and accelerating its onward progress; and hence the freer and bolder the flushing, and the more frequently water is introduced into the sewer, the less occasion will there be for ventilation. In Paris the gutters and sewers are flushed daily with water from the hydrants, 2½ hours in the morning, and the same length of time in the afternoon. With an adequate supply of water, and the impetus derived from the height of the reservoirs of supply, there is no

necessity for this system of flushing, if the water which passes through each house as waste be turned into drains, both private and public. Mr. G. Gurney reported, four years ago, to the Office of Works in London, a successful experiment which he had made for removing or destroying the effluvia of sewers. He accomplished this object by means of the steam jet, which produces a current through the sewer and conveyed with it the noxious exhalations which are then decomposed and rendered harmless by their being made to pass through a coke fire as they are drawn off. The objection to the frequent use of the steam jet in the same sewer would be the disintegration of the mortar, and action on the surface of the bricks on the inside of the culvert.

SUPPLY OF WATER.—One can hardly overrate the importance of a full supply of pure water to meet the requirements of health, whether we look to the individual or to the congregated numbers in cities and populous districts. Water, in an average state of purity, is indispensable for digestion and the elaboration of good blood, as, on the contrary, if it be hard, and contaminated with vegetable or animal matters, it perpetually disorders digestion, and gives rise to the innumerable secondary affections of the kidneys, skin, and nervous system, and an impairment of bodily strength and activity. Next to its importance as a drink is its use for culinary purposes; and, after this, bathing and preserving due personal cleanliness, and thus enabling the skin to perform its important functions, which are so necessary to the feeling and the possession of health. Closely, almost inseparably, connected with its usefulness in this way, is its paramount office in the washing of our garments and household linen. In the house itself it is impossible to remove, without the aid of water, the deposit of dust and fine ashes that arise from smoke, and the air and gases given out in respiration. As a means of preserving public health, which is but a collective term for that of the indi-

viduals who constitute the public, water ranks next to air. Unless it be obtained in abundance, there cannot be clean streets, nor can either scavenging, by removal of surface-refuse, or sewerage, by carrying off through underground conduits this refuse and exuviae of all kinds, be properly performed.

The Report of the Commissioners on the Health of Towns, made about fifteen years ago, revealed a sad deficiency of water supply in nearly all the cities and burghs of England. Only twenty-six out of the fifty towns in which their investigations extended, were supplied with water, under the provisions of any act of Parliament. Even in these the supply was very deficient, and in many of them it only extended to a part of the town; the poorest and most populous portions receiving from it little or no benefit. At Birmingham, only 8,000 out of 40,000 houses are stated to have been separately supplied; and at Newcastle-upon-Tyne, where the Cholera made its first attack in 1831, it was stated that the company supplied about one-twelfth of the dwelling-houses, and that very few of these had either tanks or tubs. In Bristol, containing, with Clifton, upwards of 100,000 inhabitants, not more than 5,000 persons, constituting the most wealthy families, are supplied with water by pipes laid into their houses; the remainder were dependent on public and private wells.

In contrast with these deficiencies, and extravagant prices the poor pay for water in many places, is its abundance in other towns, as Nottingham and Preston, for example. In the former, the supply amounts to 40 gallons *per diem* to each family; and in the latter, to 45 gallons. The intermittent supply of water at certain points in a city is reprehensible, both on the score of time and morals, not to speak of the confusion and quarreling in the crowd of persons collected round the water-stands. It cannot be said of our chief cities, Boston, New York, Philadelphia, &c., as it was by the Commissioners when speaking of the defective supply of water to the poor in-

habitants of so many of the English towns : "The present difficulty, and the labor, after a hard day's work, of obtaining water, have a very great effect on their economy, their habits, and their health. The obstacles to the maintenance of domestic or personal cleanliness soon produce habits of personal carelessness, which rapidly lower both the moral and physical condition of the whole population."

The following is an estimate of the average consumption of water, per head, in some of the chief cities, including not only what is drunk, but what is consumed *per diem* in domestic and manufacturing purposes, also for baths, stables, gardens, washing the streets, extinguishing fires, &c. By an inhabitant of Paris, $2\frac{1}{2}$ gallons; of London, 20; of Philadelphia, 30; of New York, 40; of Boston, 43; of Edinburgh, 19; of Glasgow, 27; of Vienna, Constantinople, and Montpelier, in France, 15; in all France, 5 gallons.

Various means, on a large scale, have been adopted to correct the impurities of water destined for the supply of great cities. These consist chiefly in filtration through gravel, sand, and charcoal. Boiling the water, by destroying the animal and vegetable matter which river and rain-water so generally contain, destroys the taste and odor dependent on this cause; but recourse to such a process cannot form a part of public, however useful it may be in private, hygiene. Boiling also precipitates some of the earths which were united with carbonic acid; but the neutral saline contents of the water still remain; and hence it retains the peculiar flavor which was owing to this cause.

The saving, in the less wear and tear of clothes, and in the articles of soap and soda, by the use of soft water in the place of hard, is very great. In London, for example, the cost of soap used *per annum* is estimated at upwards of five millions of dollars.

Water in Leaden Cisterns and Pipes.—A common cause of the deterioration of the purity of water arises from the mode of transmitting it from the reservoirs and main pipes to dwelling-houses in leaden pipes, for the purposes of domestic economy. It sounds paradoxical to say, and yet the assertion is quite true, that the purer the water, as respects its freedom from saline impregnation, the greater is the danger of its acting on the lead, and converting a portion of it into a salt which is there held in solution. When we speak of pure water, we suppose it to contain carbonic acid, by which its solvent power is greatly increased. Hence rain-water readily acquires an impregnation of lead from roofs, gutters, cisterns, or pipes made of this metal. The saline substances, on the other hand, found in spring and river water, impair the corrosive action of water and air, and thus exert a protecting power. Of these, the carbonates and sulphates are the most powerful; the chlorides or muriates the least so. Dr. Taylor believes that if the sulphate of lime forms only the five-thousandth part of water, no carbonate of lead is formed; and this salt dissolved in the above, or in larger proportion, in distilled water, will still confer in it the properties possessed by river water.

Dr. Dana, who doubts the protecting property of the salts of lime, suggests that the changes in the lead is produced by a galvanic action between it and iron, which may be developed by very slight difference in the state of the lead, as where the soldering is with the usual mixture of this latter and the more fusible metals. Dr. Dana proposes, as substitutes for leaden pipes in the conveying of water: "1. Wood wherever it can be used; 2. Cast iron or wrought iron tubes; 3. Copper, protected by pure tin. The use of all other metals, or alloys of these, in the present state of our knowledge and experience in these objects, ought forthwith to be abandoned." Dr. Christison speaks of an "effectual remedy" which has been lately introduced by a patent invention for covering lead pipes, both

externally and internally, with a thin coating of tin. Little inconvenience can result from the use of leaden pipes where the water flows through them by hydraulic pressure, as they can be speedily emptied before using the water which comes from the larger iron pipes beyond them. It is only in cases of slow entrance, and retention for some time of water in leaden pipes and cisterns, that the question just discussed becomes a practical one, affecting the public health.

EFFECTS OF BAD WATER FOR DRINK.—Favored, as the inhabitants of most of our large cities are, in an abundant supply of pure water furnished to them, they are beginning to forget that they ever drank that which was bad, and cannot realize fully the disastrous consequences of the habitual use of such a fluid. Generally, however, people are more easily led to believe, even if they are not themselves fully sensible of the fact, that bad water is injurious to the health than that the air which they often breathe over and over again is a poison. One of the first sanitary measures of a growing and thriving population is to procure for themselves a suitable supply of good water. All the people of antiquity were alive to this fact. The means on a large scale adopted for the purpose both in Rome and Carthage have been referred to in this report. It is not necessary for me to enlarge on this point, and I proceed to mention, as a warning to all young cities, the evils from using bad water, and as an incentive for them to take measures to procure that which is good. When this, our natural beverage, is impure, it proves to be a cause of protracted ailments in ordinary seasons, and in those of epidemic visitations it acts as a directly exciting cause of disease and death. In marshy regions, in which periodical fevers abound, water is deemed by some, on good evidence, to be as actively a contributing cause as the bad air itself. But its malignancy has been particularly conspicuous in the production of Cholera. Dr. Lankester, in describing the three kinds of water drunk by the inhabitants

of London, viz. : 1, that of the Thames and New River ; 2, that of deep wells, 150 feet for example, below the surface ; and 3dly, the surface well-waters, points out the fact that these last contain organic matters " of precisely the same nature as those found in rivers, which are the receptacles of house sewerage and saline matters, common salt, ammonia, the phosphates, nitric acid, &c., all indicative of animal excretion. Carbonic acid is largely present in these surface-waters, and from the pleasant drinking qualities it imparts to them, actually makes the more impure waters the most popular, and the most dangerous." Dr. Liddle, Officer of Health to the White Chapel District, relates the following incidents : " In a street at Salford, containing ninety houses, 25 deaths from Cholera occurred in thirty of these houses, the inhabitants of which drank water from a well into which a sewer had leaked ; in the remaining sixty houses, where pure water was drunk, there were 11 cases of diarrhoea only, and no deaths."*

A gigantic experiment, as Mr. Simon calls it, was made involuntarily and in ignorance by the parties who so largely suffered under it, in its progress during two epidemics in the southern districts of London. It is related as follows :

"These districts (comprising nearly a fifth of the population of the Metropolis) have been notorious for the great severity with which Cholera has visited them. . . . Throughout these districts, during the epidemics of 1853-4, there were distributed two different qualities of water ; so that one large population was drinking a tolerably good water, another large population an exceedingly foul water ; while in all other respects these two populations (being intermixed in the same districts, and even in the same streets of these districts) were living under precisely similar social and sanitary circumstances. And when, at the end of the epidemic period, the death-rates of these populations were compared, it was found that the Cholera mortality in the houses supplied by the bad water had been three and a half times as great as in the houses supplied by the better water.

* British and Foreign Med.-Chir. Rev., Jan. 1859.

This proof of the fatal influence of foul water was rendered still stronger by reference to what had occurred in the epidemic of 1848-9. For on that occasion the circumstances of the two populations were to some extent reversed. That company which, during the later epidemic, gave the better water, had given, during the earlier epidemic, even a worse water than its rival's; and the population supplied by it had at that time suffered a proportionate cholera mortality. So that the consequence of an improvement made by this water-company in the interval between the two epidemics was, that whereas, in the epidemic of 1848-9 there had died 1925 of their tenants, there died in the epidemic of 1853-4 only 611; while among the tenants of the rival company (whose supply between the two epidemics had been worse instead of better), the deaths which in 1848-9 were 2880, had in 1853-4 increased to 3476. And when these numbers are made proportionate to the populations or tenancies concerned in the two periods respectively, it is found that the cholera death-rates per 10,000 tenants of the companies were about as follows: for those who in 1848-9 drank the worse water, 125; for their neighbors, who in the same epidemic drank a water somewhat less impure, 118; for those who in 1853-4 drank the worst water which had been supplied, 130; for those who in this epidemic drank a comparatively clear water, 37. The quality of water which (as is illustrated in the first three of these numbers) has produced such fatal results in the metropolis, causing two-thirds of the cholera deaths in those parts of London which have most severely suffered from the disease, has been river-water polluted by town drainage—water pumped from the Thames within range of the sewage of London—water which, according to the concurrent testimony of chemical and microscopical observers, was abundantly charged with matters in course of putrefactive change." (Mr. Simon's "Report," p. 14.)

Dr. Sutherland, in his report to the General Board of Health on the cholera epidemic of 1849, says, that the injurious effects of unwholesome water had been manifest in nearly every affected place; and adds, that a number of most severe and fatal outbursts of Cholera were referable to no other cause

except the state of the water-supply, and this especially where it had been obtained from wells into which the contents of sewers, privies, or the drainage of grave-yards had escaped. Since that time much additional evidence of a confirmatory character has been collected. Two examples are recorded by Dr. Acland, in his valuable and interesting "Memoir on the Cholera in Oxford"—the parish of St. Clements, which suffered a large mortality in 1832, when the inhabitants had filthy water from a sewer-receiving stream, and an insignificant mortality in 1849 and 1854, when the water was derived from a purer source. The other case is that of the county jail, in which cases have occurred in every epidemic, whilst the city jail, which is not far from the other, has uniformly escaped. The only apparent difference between the two establishments in 1854, seems to have been that the supply of water for the use of the county jail, and of which the soup and gruel were made, was pumped from a filthy well-pool, within ten feet of one of the prison drains. No sooner were the supply-pipes disconnected with this impure source, than Cholera and Diarrhoea ceased. It appears from an elaborate inquiry by the General Board of Health, at the close of the cholera epidemic of 1854, that the contrasted effects of the disease on the people of two large sections of the population, are only explicable by the fact that one division, comprising a population of about 268,171 persons, drank impure water; whilst the other, numbering about 166,906 persons, used a clearer, and comparatively pure water. The two classes resided in the same localities, breathed the same atmosphere, comprehended the same classes, and averaging the same habits of life; in short, placed in circumstances nearly identical, saving the difference in the source whence they obtained their water for drink. The mortality from Cholera among the drinkers of impure water—of water impregnated with the sewage of the metropolis, and containing in solution a large

quantity of saline matter, derived from the intermixture of sea-water—being at the rate of 130 to every 10,000; that of the drinkers of the pure water being only at the rate of 37 to every 10,000 persons living.*

In the report on Epidemic Cholera in London, in 1854, by Dr. Sutherland, much interesting information is afforded on the influence of water upon the spread of the disease. The deduction from the microscopical and chemical examination of the water used in the houses and neighborhoods where the disease was most prevalent, by Dr. Hassall, was: "That there is no water supplied to the metropolis that does not contain dead and living organic matter, animal and vegetable. But the Thames Ditton water, supplied by the Lambeth Company, is by much the purest of the waters, while the Southwark and Vauxhall water is one of the worst, and the waters of the other companies might be arrayed in a series between these two." From an inquiry instituted by the Registrar-General, the following results appear: "In 26,107 houses that derived the water from Ditton, 313 deaths from Cholera occurred in ten weeks. In the 40,046 houses that received the impure water from Battersea, 2445 persons, it was ascertained, died from Cholera in the same time. The deaths in the latter districts exceeded by nearly 2000 the deaths that would have occurred if Cholera had only been as fatal as it was in the houses that derived their water from Ditton." Dr. Sutherland makes the following remarks upon these results: "When it is considered that the sanitary condition of the population does not materially differ, except in the quality of the water supplied by the two companies, it is difficult to resist this statistical evidence of the predisposing effect of the Battersea water, and of the loss of life which has arisen from its use.†

* British and Foreign Med.-Chir. Rev., January, 1857.

† Ibid. July, 1855.

The deleterious effects of impure water are not seen in cities or large towns alone ; they occur in small villages, sometimes in the solitary farm-house—any place, in fine, in which the pump or draw-well is in the midst of a farm-yard or filthy court ; receiving the surface-drainage of heaps of stable manure, pig-sties, &c. How often do we notice, says Dr. W. J. Cox, green, slimy, stagnant pools, in the close vicinity, and affording the sole water-supply, of cottages. Such a state of things does not often occur in this country ; but in too many instances there is a neglect to obtain an adequate supply of pure water, the penalty is paid in the frequent occurrence of bowel-complaint, and the sudden inroads of epidemic cholera, which makes its attacks without any other apparent provocation. In the new settlements of the West, the enterprising pioneer and his family often pay a tax in the shape of disease, and not seldom of life itself, from the use of bad water or its imperfect supply ; and in new towns other schemes of improvement are tried, before sanitary measures, both for present and future protection, such as paving, drainage, and a supply of good potable water, are thought of.

Dr. Cox tells us, that water tainted with various organic matters, whether gaseous, as carbide or sulphide of hydrogen, or solid, as putrescent vegetable fibre, or vitalized, as algæ, confervæ, hydræ, fungi, infusoria, &c.—is a very frequent cause of severe visitations of bowel complaints during the summer months. Several instances came under his own observation, in 1853 and 1854, of the aggravation of epidemic diarrhoea from this cause. “That water falling on a growing soil, and running off to lie in stagnant pools, is sure to become tainted with animal and vegetable life, is well known ; and when to this is superadded the circumstances of the said soil being highly charged with effete organic products, the water thus collected must necessarily be highly impure, and most unfit for human consumption. Yet very often it forms the

only available source of supply." Dr. Cox alludes to epidemic *scarlatina simplex* showing itself in a small agricultural village in the west of England, in August, 1856. There occurred in all thirty-eight cases, chiefly among the peasantry, whereof three proved fatal. Two of these were in one house, the residence of a wealthy farmer. Here the disease changed its character, assuming the worst asthenic type, with intense throat-affection, and, as is so frequently the case, defying all treatment. The persons attacked were a servant girl and three children, the two oldest of the latter of whom died. The younger child and the servant girl recovered with some difficulty. The probable cause of the malignity and fatality of the disease in this family was its bad water-supply. It was derived from a shallow draw-well in the back-yard, imperfectly covered, surrounded by heaps of decomposing manure and cow-sheds, the black drainings from which were constantly flowing over the soil. Dr. Cox examined the water from this well on two occasions, before and after heavy rains. The first analysis showed sixty grains of solid matter (chiefly nitrates) in the gallon, of which five grains were undecomposed organic matter. The second analysis (after the rain) gave the enormous amount of between seven and eight grains of organic matter. The rest of the village derived its chief supply of water from a good public well, situated at a little distance in a large field, and properly covered from the weather.

Water tainted with putrid contents sends into the air a much larger quantity of noxious organic matter than it receives from the air. If we take the Thames river, for an example, where it flows through London, it has been calculated that 4,000,000 of gallons of water rise daily, in the form of vapor, from the surface of the river within the city limits, carrying with it into the atmosphere some portion of the putrid contents of the river.

INTEMPERANCE.—The transition is easy from one noxious drink to another—from bad water (nature perverted) to alcoholic liquors (art perverted)—viewed as the cause of so much intemperance and disease, under a great variety of aspects. As a question of public health it comes necessarily under our notice, and as such alone it can be studied here. We are not called upon to arbitrate between the two doctrinal extremes in regard to the dietetic usage of this class of drinks, but simply to look at things as we find them, and, as in the case of any other form of physical evil afflicting a fellow-creature, either standing by itself, or implicating at the same time the moral and intellectual faculties, to limit, if possible, its diffusion, and to find means for its prevention. The first of these objects aimed at, is done by legislative enactments, enforced by suitable penalties; the second, or preventive, is more certainly brought about by individual will, aided by, and at the same time aiding, voluntary association with others. Everywhere drunkards, or, as they are usually called, the intemperate, which is the more correct term of designation, are among the first victims of epidemic, and also contagious febrile diseases. They are more readily attacked, and more readily sink under disease, than any other class of persons. “The pernicious effects of *intemperance*, in predisposing to the disease [cholera], have been recognized by all writers, in the East Indies as well as the different countries of Europe. What, then, must have been the mischief done by this debasing and life-destroying sin in a country like ours [England], where it has been computed that upwards of twenty millions of sterling are annually spent upon ardent spirits alone?”*

The value of temperate habits among the poor, in prolonging life and diminishing sickness, has been exhibited in the comparison of temperance provident societies with other societies. The Teetotal Society in Preston (of which how-

* Brit. and For. Med.-Chir. Rev., vol. vii. p. 33.

ever, the numbers are rather small for the purpose of any general deduction), presents, as we learn from the sanitary report of the Rev. Mr. Clay, not merely the smallest proportion of sick, but it also suffers the shortest average duration of illness. The annual mortality in the Temperance Provident Society (of London), during seven years, has averaged only 4 in 1,000. In agricultural laborers, in the prime of life, the most highly-favored of the working-classes, it is 8 per 1,000. Among healthy persons, generally, it is rated at 10 per 1,000. Among clerks, at the same age, it is no less than 23 per 1,000.

It will naturally be asked whether sanitary measures, which are admitted to be both necessary and praiseworthy, or preventing the noxious effects of bad air, generated by street and household refuse and impurities, or by a neglect of paving and sewerage, as well as for arresting the sale of tainted meat and spoiled provisions generally, should not also be brought to bear against the abuse, if not the use, of so active a poison as alcohol, especially in its stronger forms of combination. In some countries in Europe the apothecary is forbidden to sell a poison without an express prescription or order from a physician; and in every country he would be looked upon as open to prosecution, if he passed across his counter a poison, with a knowledge that the purchaser intended to make use of it at the peril, if not the cost, of his life. Ought a man or a woman—for the sex is not always ashamed to be seen engaged in such a calling—behind a bar, be allowed privileges not granted to an educated and careful apothecary? But, while we condemn the apothecary for selling a small vial of laudanum, the contents of which, if swallowed, cause insensibility and other alarming symptoms, if not death itself, we can not only tolerate, but give, as voters, and legislators, and judges, our countenance to the bar-tender, whose customer is allowed to drink his bottle of distilled liquor, with

a similar risk of being made—dead-drunk—insensible, and sometimes ending his life in this state of insensibility. No terms of censure and condemnation are thought to be too severe on the person who is administering, at stated intervals, a slow but certain poison, with intent to kill; but men generally have little to allege against the person who also administers, across his bar, a certain poison, under the plea of his ignorance of, it may be his indifference to, the consequences. The more violent and acute paroxysmal disturbances, induced by alcoholic drinks, sometimes excite alarm, but the popular mind has not attained to a full knowledge of the subject, as far as relates to its chemical and physiological relations; and until it is enlightened on these points, we must be slow to censure those who still foster, directly or indirectly, the habit of intemperance, by refusing to sanction, or themselves to set the example of, the avoidance of a practice which so soon and so often becomes a habit, and a dangerous habit too.

One important effect of alcoholic drinks, which pervades the entire organism, while it seems at first confined to the function of respiration, is to diminish the amount of carbonic acid eliminated from the lungs and skin. Valentin, Prout, Fyfe, and Vierordt, certify to this fact. Dr. E. Smith speaks of brandy and beer as greatly decreasing the respiration, and the quantity of carbonic acid exhaled. Dr. Bocker found, from his experiments on his own person, that those beverages diminished by at least one-fifth the amount of carbonic acid exhaled. In 1854, Mr. W. J. Cox, from whose paper* we are now borrowing, performed the experiment of collecting the carbonic acid evolved from the lungs of two healthy individuals during one hour, both before and after administering a dose of alcohol, in the shape of whisky. In the first case, the quantity of gas evolved, previously to taking the alcohol, was twelve hun-

* Epidemics and their Every-day Causes, in *Sanitary Review*, vol. iv. p. 259-60.

dred cubic inches ; after it, nine hundred and fifty only. In the case of the other person, the quantities were respectively nine hundred, and six hundred and twenty cubic inches. These facts show, continues Mr. Cox, that the presence of alcohol in the circulating current is always associated with a diminished percentage of carbonic acid in the air expired, and in the exhalation from the cutaneous surface. The blood becomes thereby loaded with effete carbon. An analysis was made by Mr. C. in 1850, of the blood of two *delirium tremens* patients. It was, in both instances, attenuated and deficient in plastic material ; containing a great excess, or from six to eight times more than common, of fatty matters. Lecanu found in one case of a sot, the still higher proportion of one hundred and seventeen parts in one thousand. Now, any agent which checks the depuration of blood in the lungs, and retains in them the effete products of the circulation, as is done in the case of the blood of a drunkard, must be eminently deleterious. It yet remains to be determined whether the blood of a moderate habitual drinker is *pro tanto* in a similar state. Were we to draw conclusions from the prompt effects in the experiments by Mr. Cox, we should answer in the affirmative. This writer has, however, no hesitation in urging "the following fact, which has received overwhelming proof, that the *least* habitual excess *beyond* a very moderate indulgence in fermented beverages lowers the vital properties of the blood ; destroys the normal tone of the nervous centres ; and as a constant *sequela* most powerfully predisposes the frame to the absorption of epidemic virus of whatever kind. Pure aerated blood affords the best safeguard against the attack of any epidemic. But the more perfect system of house ventilation, cleanliness, &c., will fail to secure this, if by the constant imbibition of alcohol in excess, the functions of the lungs and skin are interfered with, their healthy relations destroyed, and their waste products retained within the current."

We have the encouraging reflection in nearly all the efforts and plans of hygienic reform, that as one evil often gives strength to another, so does the abatement of one evil aid in bringing about a similar change in regard to another; and hence, as living in filth, breathing a close and impure air, and want of nutritious food, and of adequate hours of sleep, predispose to intemperance in the use of alcoholic drinks, so will cleanliness, light, fresh air, proper food, and diminished toil, do much to prevent the habit being formed, or to cure it if it has been formed. Judicious sanitary reform is therefore favorable to temperance, as *e converso*, temperance is an indispensable auxiliary to sanitary reform—if only by its inspiring the individuals who are to be its subjects with a desire, and, at the same time, the requisite bodily vigor, to engage in industrial pursuits. Everybody must, by this time, be familiar with the fact of the pecuniary loss to his family by the idleness of the inebriate, and the cost to the public treasury for his ultimate support in the last stage of destitution; to say nothing of the expense of measures of repression and punishment called for by the breaches of peace and crimes committed by the intemperate.

PREVENTABLE DISEASES AND MORTALITY.—Having exhibited one view of the importance of sanitary measures for cities, viz., that arising from the attention at all times given to them as a necessary condition for growth and prosperity, and the punishment in various ways, and often on a large scale, when the subject has been neglected, we shall next take a more pleasing and encouraging one, and which contrasts strongly with the first. But before noticing some of the beneficial changes in the physical well-being and comfort, and even an improved moral tone, which have resulted from sanitary reform, we have yet to say something on losses of life and money incurred in many places, by the persistence in old

abuses, owing more to ignorance of hygienic laws, than to purposed wrong-doing or want of humanity.

Dr. Lyon Playfair, taking the single county of Lancashire, in England, which includes indeed the large cities of Liverpool and Manchester in its bounds, showed some years ago, by tabular statements, that there are every year in Lancashire 14,000 deaths, and 398,000 cases of sickness which might be prevented, and that 11,000 of the deaths consists of adults engaged in productive labor. They farther show, continues Dr. Playfair, that every individual in Lancashire lives 19 years, or only one-half of the proper term of his life, and that every adult loses more than ten years of life, and from premature old age and sickness much more than that period of working ability. Without taking into consideration the diminution of the physical and moral energies of the survivors from sickness and other depressing causes; without estimating the losses from the substitution of young and inexperienced labor for that which is skillful and productive; without including the heavy burdens incident to the large amount of preventable widowhood and orphanage; calculating the loss from the excess of births resulting from the excess of deaths, or the cost of the maintenance of an infantile population, nearly one-half of which is swept off before it attains two years of age, and about 59 per cent. of which never become adult productive laborers; and with data in every case much below the truth, Dr. Playfair estimates the actual pecuniary burdens borne by the community in the support of removable disease and death in Lancashire alone, at the annual sum of five millions of pounds sterling—twenty-five millions of dollars. He would draw attention to the columns respecting the number of preventable cases of death and sickness in Liverpool and Manchester, or in any other of the large towns, to show the immense amount of money which might be saved by proper sanitary arrangements.

Another view of the subject of preventable diseases and deaths is presented in the following guise : Taking the least unfavorable sanitary conditions of a certain number of people living in sixty-four districts, in various parts of England, as a standard, we may call the difference between this and the general mortality as preventable, and make our estimates accordingly. The people now referred to dwell in sixty-four districts, extending over 4,797,315 square miles, and their number at the last census was 973,070, or nearly a million of souls. Although living undoubtedly under many favorable sanitary conditions, yet investigations will lead to the detection of many sources of insalubrity, such as small, close, and crowded bedrooms, and a neglect of cleanliness of person, and in the surroundings. And yet after all, "the annual mortality per 1000 of this million of men, women, and children, year after year, does not exceed 17. Is it not evident, that under more favorable auspices, the death-rate would be still lighter? Under such sanitary conditions as are known, and with all the appliances existing, can we not imagine a community living a healthier life than those isolated people?"* Setting out, however, from this standard, we are safe in affirming that deaths in a people exceeding 17 in 1000 annually, are unnatural deaths. "If the people were shot, drowned, burnt, poisoned by strychnine, their deaths would not be more unnatural than the deaths wrought clandestinely by disease in excess of the quota of natural death; that is, an excess of *seventeen* deaths in 1000 living."

It may be alleged that an excess of deaths over the standard is inevitable in large cities, but, as justly remarked by the *Review*, whose train of argument we are now following, we lack the measure-line between the attainable and the inevitable loss. "In London, during the sixteenth century, the population lived about twenty years on an average, and 50 died out of 1000 living; consequently the excess over 17 was

* *Sanitary Review*, vol. iv pp. 87-8.

33. That this excess was not inevitable is now demonstrated; for, with a great increase in number, the population now lives about 37 years, and the mortality has fallen to 25 in 1000. Is the excess of 8 deaths a year among every 1000 living, inevitable? This cannot be admitted for a moment, if we regard only the imperfect state of the sanitary arrangements which the public authorities of London have within their power. Nor can it be admitted that the excess of 5 deaths—or 22 deaths instead of 17—a year, on every thousand living, is inevitable in England and Wales, with evidence before our eyes of the same violations of nature in every district.” Of the 420,019 persons who died in England in 1857, about 328,163 would have died had the mortality not exceeded the standard of 17 deaths in 1000 living. Of the difference, 91,856, or what may be called the unnatural deaths, 18,328 happened in the country, or in the village districts, and 73,528 in the town districts. To extend the argument. Within the shores of the islands of Great Britain and Ireland dwell nearly eight millions of people who “do not live out half their days; *a hundred and forty thousand* of them die every year unnatural deaths; two hundred and eighty thousand are constantly suffering from actual diseases, which do not prevail in healthy places; their strength is impaired in a thousand ways; their affections and intellects are disturbed, deranged, and diminished by the same agencies.”

Dr. Hutchinson sums up the loss to the city of London, growing out of the preventable deaths, 10,000 in number, and of the preventable cases of sickness, 20,000 in number, annually, to be, for funerals, medical attendance, loss of wages, and expense of widows and orphans, £500,000, or \$2,500,000. In addition to this, he estimates the loss to the community at £1,000,000, or \$5,000,000. He charges to the same account the sums that might be saved by the consolidation of existing boards and companies, improved water-supply, suppression of

smoke-nuisance, and revenue from sewer-water, amounting to more than another million of pounds, or five millions of dollars. This gives a sum of nearly three millions of pounds, or fifteen millions of dollars, lost by preventable disease and death, and otherwise bad sanitary economy, to the city of London. Mr. Banfield's estimate of loss to the United Kingdom, from these causes, amounts to fifty-five millions of pounds, or two hundred and seventy-five millions of dollars, per annum.

In the single State of Massachusetts an estimate exhibits an annual loss to the commonwealth of \$62,000,000 to \$93,000,000 by the premature death of persons over 15 years of age.

Of the preventable mortality a large proportion occurs in the early or infantile period. Parents, on the spot, would be startled at the announcement that the probabilities are against their child reaching its second year; and yet in Manchester, Mr. Robertson assures us, in his account of the statistics of mortality in that town, that for every 100 infants born (in the township), upwards of 33 males and 26 females die within the year; whereas in Dorsetshire, the proportions are less than half these numbers. For the next period of life (from one to two years), the percentage of male deaths is 18, and of female deaths upwards of 16; but in Dorsetshire the proportions are less than one fourth of this amount.

In Liverpool, the low sanitary state of which has been already mentioned, the proportion of deaths to the whole population is as low as 1 in 28.75, and the average duration of life is only 20 years. Some have thought that the large emigrant floating population of Liverpool, chiefly Irish, contributed much to the increased mortality and low average of life in that city; but this is a fallacy, exposed by Dr. Playfair, who shows that in both of these particulars they have greatly the advantage of the fixed resident population.

Not only is the mortality much increased by the preventable causes of disease, but the physical vigor of the survivors is diminished by the same causes. The recruiting officers in the county of Lancaster, which used to furnish the best soldiers in the country, complained to Dr. Playfair that the sons are less tall than the fathers, and that the difficulty is constantly increasing of obtaining tall and able-bodied men.

Diseases of the respiratory organs, including phthisis, exist, according to Dr. Playfair, in the great manufacturing districts of Lancaster and Cheshire, to a greater extent than in any other part of the kingdom.

It has been estimated that the mortality among the poorer classes in England might be reduced 20 per cent. by means within administrative control, to say nothing of the abatement or removal of other causes depending on their personal habits, which are intimately associated with those of the first-mentioned class.

In the town of Preston, we learn, from the full and exceedingly interesting report of the Rev. J. Clay, that, while the deaths in the whole town are one in every 29 persons, yet in streets which are described by him, where there is a neglect of sanitary measures, and the inhabitants of which are equally negligent, the proportion is one death in every 19 persons.

The large proportion of infant mortality in Preston, among the working classes—those least favored on the score of sanitary protection—is an evident melancholy fact, bearing on the same argument. With the gentry, the loss is only $17\frac{1}{2}$ per cent. of infant life (children under five years of age), while the operatives' loss is 55.5 per cent. For the whole of England and Wales the percentage of deaths is 39.1.

The average age of deaths, including children, of the different classes in Preston, is still further confirmatory of the position laid down. For "gentlemen," it is 47 years; for "tradesmen," 32 years; and for "laborers," 18 years.

In our own country the subject of infant mortality is one of the highest interest, especially in towns. We would again refer to a valuable paper on this very important subject, by Dr. D. M. Reese.

This gentleman, in his evidence before the New York Senate Committee, asserts, and as we believe on good grounds, that: "Infant mortality in large cities in a great multitude of examples," &c., ending, "and life." (See the Senate Committee, Rep. p. 99.)

On this subject, which is one of such vital importance to the public health in all cities, instructive reference can be made to Mr. Hartley's "Essay on Milk, as an article of Human Sustenance." The writer takes equally strong ground with that assumed by Dr. Reese, and in confirmation of his view, he adduces a certificate, signed by fifty-eight physicians of the city of New York, men of professional eminence and worth, affirming their belief, that the milk of cows, fed chiefly on distillery slops, is "extremely detrimental to the health, especially of young children, as it not only contains no little nutriment for the purposes of food, but appears to possess unhealthy and injurious properties, owing in part, probably, to the confinement of the cows, and the bad air which they consequently have to breathe, as well as the unnatural and pernicious nature of the slop on which they are fed." Dr. Charles A. Lee, in two letters to Mr. Hartley, adduces his personal observations and experience to the same purport.*

Under the operation of improved sanitary measures in the city of New York, the Committee of Investigation believe that the amount of thirteen millions of dollars, the estimated cost of avoidable sickness and death, and the unnecessary loss of five thousand lives per annum, might be prevented, with an effect upon the happiness and morals of the people which can neither be reckoned in figures nor expressed in words.

* Eleventh Annual Report of the New York Association for Improving the Condition of the Poor, for the year 1854.

The following is a statement of the number of the indigent sick who were gratuitously provided for by the public institutions of the city of New York, in the year 1853 :

" New York Dispensary.....	46,338
Eastern "	19,706
Northern "	14,075
Demilt "	9,006
North-Western "	4,964 .
New York Hospital.....	3,526
Bellevue Hospital	4,836
Blackwell's Island Hospital.....	3,034
Ward's Island Hospital	10,794
Marine Hospital.....	4,938
<hr/>	
Total	121,217

" Startling as are the above figures, they doubtless fall far short of the reality. To this list of 121,000 sick, who are chiefly unskilled laborers, of the most destitute class, should be added multitudes of the same class that are relieved by private benevolence, and the numerous organized charities in the city ; also those cared for by the different churches and beneficial societies ; and last, but not least, the great body of operative artisans, builders, &c., in humble life, whose occupations sometimes, but more frequently their unhealthy dwellings, induce debility, sickness, and incapacity for labor."

" Infant mortality, in large cities, in a great multitude of examples, which no man can number, is caused by the impure and adulterated milk, and other unwholesome articles of food, which are among the necessities of life. Our profession has ever and anon sought to arouse public attention to this important subject, but in vain. Distilleries in or near large cities would be an intolerable nuisance and curse, apart from the mischiefs of their manufacture of alcoholic drinks, in view of the single fact that, wherever they exist, their slops will

furnish the cheapest food for cows, the milk from which is more pernicious and fatal to infant health and life than alcohol itself to adults ; poisoning the very fountains of life. So long as distilleries are tolerated in cities, cow-stables will be their appendages, and the milk, fraught with sickness and death, will still perpetuate mortality, especially among the children of the poor. All the artificial adulterations of milk, as by water or chalk, &c., are harmless—nay, laudable, compared with the poisonous supply obtained from cows fed on distillery slops, for to this poison chemistry itself affords no antidote, since it defies all analysis or synthesis—a poison *sui generis*, utterly destructive both of health and life.”

The deaths from pulmonary consumption in England and Wales are represented to amount annually to 36,000, of which one half are said to occur in London. Dr. Guy attributes the great mortality from this disease to be owing to “defective ventilation of houses, shops, and places of work. Next to this, in point of importance, is the inhalation of dust, metallic particles, and irritating fumes. One cause, over which the poor themselves can exercise control, is the abuse of spirituous liquors, a frightful source of consumption.” The death-rates of consumption are susceptible of being much diminished.

Mention was made, under the head of Ventilation, of the sufferings, from neglect of this matter, incurred by tailors. The economy of a better sanitary system with them is set forth as follows: “If the employers and the men had been aware of the effects of vitiated atmosphere on the constitution and general strength, and of the means of ventilation, the practicable gain of money from the gain of labor by that sanitary measure could not have been less, in one large shop, employing two hundred men, than £100,000 (\$500,000). Independently of subscription of the whole trade, it would diminish their working period of life, and have been sufficient, with the enjoyment of greater health and comfort by every workman

during the time of work, to have purchased for him an annuity of £1 (\$5) per week for his comfortable and respectable self-support during a period of superannuation, commencing soon after fifty years of age."

When speaking of the greatly increased cost of sewers, owing to defective arrangements in their first construction, the amount lost in this way should be put under the head of money that might have been saved by judicious sanitary measures.

In comparing the mortality of the town of Salford, in which thirty-one persons per thousand die annually, and of Manchester, which is still greater, with the neighboring town of Broughton, where only fourteen persons in a thousand die annually, Mr. Chadwick enters into some instructive calculations, which go to show that there are 700 deaths annually from preventable causes alone; hence to remove these causes might insure an annual saving of a sum of money exceeding £40,000, or \$200,000. To effect this saving, the main thing required is that the working classes should understand what are the sanitary requirements to secure health and comfort to their homes. The above sum is based on the estimate that there are twenty-five cases (Dr. Playfair says 28) of illness, on an average, to one death. Each death costs, on an average, £60, or \$300, including funeral expenses, medical attendance, loss of labor, and the like. The reference to the necessity of awakening the intelligence of the working classes to a correct view of preventive hygiene, reminds us of the advice so forcibly expressed by Dr. Kissam, as to the means of abating the evils of poverty, so as to reduce the mortality among the inhabitants of certain districts in the city of New York. Dr. Kissam says, with much force: "The poor must have good dwellings to live in, and they must have medical missionaries to teach them how to live. They are taught upon almost every other subject than about how to live. They do

not know how to cook their food ; they do not know that they are poisoned when four or five of them sleep in a room without ventilation."

SANITARY IMPROVEMENTS.—The importance and economy of sanitary measures for cities are evinced in the great benefits derived from sanitary improvements. Hamburg suffered severely from the cholera in 1832. In 1842 occurred a grievous calamity, as it was thought at the time, in a fire which destroyed nearly a third of the city. The rebuilt portion shows that in it due attention has been paid to drainage and other requirements ; and the effect was tested in its having enjoyed an exemption from the cholera of 1848, alike remarkable and important. A comparison of the state of the poor, living in the rebuilt parts of the town, with those living in the old parts, showed that not more than one of the former had been attacked with cholera for ten of the latter. Exeter, in England, affords another remarkable illustration of the benefit obtained by the adoption of improved hygienic measures. These consisted in improved drainage, an ample supply of good water in every part, pulling down of old houses, the removal of nuisances, and greater general attention to the sanitary condition of the poor. In 1832, before these reforms were even thought of, the deaths from cholera were 402, and a vast amount of suffering, as well as heavy expenditures, inflicted on the town. In 1849 not more than ninety-nine cases in all occurred in Exeter, and one half of these took place in the single parish of St. Edmund, in a low, unwholesome district, near the accumulations of a main drain from the city, immersed in putrid exhalations. A still more instructive example is afforded by Nottingham. Upwards of 1000 cases of cholera, of which nearly 500 were fatal, occurred there in 1832. At that time Nottingham, like Exeter, was badly supplied with water, besides its being ill-drained, extremely filthy, and very densely populated. The ravages of the pestilence

were confined in a great measure, to the worst localities, the higher and better-conditioned district escaping almost entirely. Since then very much has been done for the improvement of the town. It now enjoys an almost unlimited supply of wholesome filtered water. Nuisances were removed, and the condition of the dwellings of the poor improved. The result was, that in the autumn of 1848, although a filthy village within five miles of Nottingham was severely attacked, yet the town remained entirely exempt, nor did a single case occur there until December in the following year, although there had been much diarrhoea during the season—a clear proof that the epidemic influence had been felt—when five fatal cases occurred. In the same line of encouraging results from increased attention to hygienic reforms occurs the example of Tynemouth, eight miles below Newcastle and Gateshead, in the north of England. This town, like the last two mentioned, suffered severely from cholera in 1848–49, losing 463 out of its population of 64,248. Thus warned, active sanitary measures were adopted, and when in 1852 cholera was again epidemic, those exertions were redoubled; and, as a consequence, 1852 saw Newcastle and Gateshead suffering “from the most terrible outbreak of cholera yet experienced in England, whilst Tynemouth, only eight miles lower down the river, was exempt, although numerous cases of diarrhoea plainly showed that over it the choleraic influence extended, but found no congenial soil.” Evidence to the same purport was furnished in different cities of the United States during the cholera outbreak of 1849; as, for instance, in Boston and Philadelphia—although the sanitary measures adopted did not imply organic changes, but were mainly confined to the removal or abatement of certain nuisances, domestic and otherwise, cleansing the streets, &c.

As justly remarked by the *British and Foreign Medico-Chirurgical Review*,* to which we are continually indebted

* Vol. vi. pp. 36–37

for so much in all that relates to British sanitary progress: "But far more gratifying, in every point of view, is the clear testimony which the late epidemic afforded of the strikingly beneficial results of substantial structural improvements in averting the fatal effects of choleraic disease. From a large mass of evidence we select the following facts as illustrative of this most important subject: The three model lodging-houses in the metropolis—two of them situated in a most unhealthy district, and where there were numerous fatal cases around—escaped almost entirely. There were a few cases of diarrhoea among the inmates (210 in number,) and only one case of cholera, which occurred in an old man intemperate and ill-fed. The complete immunity of the 'Metropolitan Buildings' in Old Pancras Road, containing upwards of 500 inmates, was equally striking, although within a few hundred yards the epidemic was so severe that three deaths occurred in one house, and the whole neighborhood was severely afflicted with diarrhoea. Of the metropolitan *prisons*, two suffered severely, while the seven others remained nearly exempt. In the model prison at Pentonville, whose sanitary arrangements are good, there was no cholera, and very little diarrhoea among 465 inmates. Giltspur and Newgate prisons enjoyed, the former a complete, and the latter an all but complete exemption, although the district around suffered with extraordinary severity. The case of the House of Correction, in Cold Bath Fields, is, perhaps, the most instructive of all. In 1832, when the number of prisoners was 1148, there occurred 319 cases of diarrhoea, 207 of cholera, and 45 deaths. At that time the drainage of the prison was most faulty, the sewers having in places fallen in and become choked with soil. Subsequently the whole sewerage was rebuilt, and on examination previous to the late epidemic it was found to be in good order. The ventilation, also, of the cells had been improved, and a small open fire was placed in each of the day-rooms. Out of 1100

prisoners there was not a single instance of cholera, and only a few cases of diarrhoea, which speedily yielded to prompt treatment. Bridewell prison afforded equally satisfactory results. In 1832 it was in a most filthy state, and the prisoners were much crowded. Sixteen cases, four fatal, occurred in the epidemic of that year. The sanitary arrangements of the prison have since that period been rectified; and while the pestilence raged on all sides of it, in houses separated only by a narrow wall, no case of cholera took place, though fresh prisoners of the very lowest class were daily brought in. There was only one case of the malignant form of the disease in Horsemonger Lane Jail, which is situated in a district that suffered most severely. The two public metropolitan lunatic asylums of Bethlehem and Hanwell escaped without loss of life, although cholera prevailed extensively and severely within a hundred yards of the former, and the latter was visited with a rather sharp attack of diarrhoea, showing clearly that the morbid influence was there." To these remarkable proofs of the exemption from a fatal epidemic enjoyed by good internal hygienic arrangement, we may add the case of the jail at Taunton, a town with a population of 16,000, during the prevalence of the cholera in 1849. Not a solitary case even of diarrhoea occurred among the prisoners in the jail; which offers a remarkable contrast with the state of things at that period in the work-house, the inmates of which lost by death from cholera 22 per cent. of their number, or 60 out of 276. This last building was low, badly drained, and most imperfectly ventilated; there were numerous nuisances within the walls; the people had insufficient space allowed them, and personal cleanliness was very much neglected. The space allowed for each inmate was not above two thirds of what was requisite for safety. The stress of the attack was in the girls' school-room, in which the greatest degree of over-crowding existed. The prisoners in the jail were much better cared for than the poor inmates of the Union Work-house. Each cell

contained from 800 to 900 feet and upwards of air, besides being systematically ventilated and warmed, to maintain an even temperature throughout the twenty-four hours. Moreover, each prisoner had the means of personal cleanliness, and attention to this was strictly enforced throughout the building. The result was that the health of the prisoners remained throughout perfectly good.

A similar exemption from cholera in 1849 was enjoyed by the Eastern Penitentiary of Pennsylvania in Philadelphia.

PULMONARY AND CUTANEOUS PURIFICATION.—The consensual, and in a measure identical action of the lungs and skin, is not so generally known or attended to as is demanded by the interests of both public and personal hygiene. The lungs and the skin are both of them engaged in the same offices, viz., 1, to evolve gaseous and animal matters, the retention of which would be injurious to the organism; and, 2, to introduce into the blood the vitalizing element, or the oxygen of the atmosphere; and hence both organs, the pulmonary and the cutaneous, require a supply of fresh air. Both of them require also the additional purifying aid of water. The lungs receive their share in the shape of ordinary atmospheric moisture, and how they rejoice in this is seen in the rosy cheeks, implying active pulmonary circulation and respiration, of the inhabitants of the moist climates of England and Holland. The skin receives its share more commonly in the shape of water, directly applied to its surface, as in the process of ordinary ablution, and of bathing; and in some countries, on a large scale by vapor baths. Both the lungs and the skin exact as a condition for the healthy discharge of their functions, that they shall have their air-bath for transpiration, and their water-bath either as simple aqueous fluid or as vapor, to deterge the respiratory and cutaneous surfaces, and to enable them to cast off, in the first case, mucus, and in the

second, the perspirable and oily matters. Cleanliness, in its true comprehensive meaning, cannot be carried out so as to meet the wants of the animal economy, unless we attend to these requirements. Our senses revolt at the mere offer of dirty water for drink ; but nature displays equal repugnance when dirty, that is, impure air is offered for breathing ; and no less injustice is done to the lungs by the inhalation of foul air, in which are floating, at the same time, particles of fine dust, rising from different substances in manufacture, than would be to the skin, if first, ditch or gutter-water, and then sand and dirt, were sprinkled over it. The very idea of swallowing or even tasting the fluid substances ejected as excreta, or thrown off by disease, from the body of another person, or even from our own, is abhorrent to all ; and yet how few scruple about receiving into their lungs, by respiration, the impure exhalations from the lungs of everybody in the same room with themselves. But they are doing more at this time ; they are inhaling not only the foul air which escapes from the lungs, but also that and the kindred cutaneous emanations of all those present on such an occasion.

Public Squares and Parks.—We make these remarks as introductory to, and with a view of enforcing, not merely the desirableness on the score of pleasurable bodily sensations, but also the necessity on that of health, of out-door exercise in a fresh and pure air, and of regular bathing in pure water, whether it be fresh or saline. Attention to these things is a duty which every individual owes to him or to herself, but unless it be regarded at the same time as part of public hygiene, and carried into effect by proper sanitary measures, the inhabitants of cities cannot meet the requirements of the case, and must suffer if they are not aided by judicious municipal legislation. The opportunities afforded for ventilation are availed of to a certain and too often to a very limited extent in the house ; they are more effective in the street ; but they

can only be said to have received their full, or in a measure their satisfactory development in public gardens, squares, and parks, in which the delicate and the valetudinarian adults more especially, and all those of tender age, may find compensation for their inability to visit the suburban districts, to breathe fresh air, and to be livened by the sight of herbage, flowers, and trees, in their habitual and ever-pleasing livery. These advantages are all easily attained in the spots of the kind just designated, which on this account can never be too highly prized, nor too greatly multiplied. But there is yet another and a large class, namely, the artisans and mechanics, whose engagements are such as to keep them within the narrowest city limits, and who, fatigued and jaded with their prolonged toil, are too often prompted to fly for present excitement and relief to the drinking-shop, or tavern, in place of drawing on the stimulants which nature affords in the cordial of a full measure of oxygen of the pure air of these open and ornamented places. Here they would experience, in addition, the grateful excitement of the senses in admiring the grass-plots, and the rich parterres, with their shrubs and flowers, while seated under the shade of the spreading trees, and refreshed by listening to the falling water of a fountain, while watching at the same time its feathery spray. It is in such places that town rivals the country, and that nature and art join together to promote the public health, and incite to innocent gayety and enjoyment.

Gymnasia and Museums.—But something more is required for the youth, and the industrious mechanics and working men generally, of a city, than space for walking for themselves and their families, important as this confessedly is. Grounds ought to be set apart for gymnastic exercises and various manly sports, under the supervision of competent instructors.

Connected with these grounds there might be instituted museums of natural history, models of machinery, and even specimens of the fine arts; thus creating in the minds of all who would visit these places, associations of the most pleasing and instructive kind. If we suggest these things as measures of health, others might strengthen our suggestion by urging them as an affair of morals.

Until within the last few years, it was thought that there was something in the Anglo-Saxon disposition and character which unfitted the people of Great Britain and the United States for a due appreciation of the benefits and pleasures of public walks and gardens, and of museums and galleries of art; and that if these places were thrown open to the public, they would be injured, if not destroyed, by the Vandal multitude. Trials made on a large scale, as for instance by throwing open the British Museum, in London, and the grounds and the palace, including the collection of paintings, at Hampton Court, to the public of all classes, have dispelled this notion. The following carries with it instruction. On the occasion of a projected chartist meeting at Manchester, which greatly alarmed the municipal magistrates, Sir Charles Shaw, the Chief Commissioner of Police, induced the Mayor to get the Botanical Garden, the Zoological Garden, and the Museum of that town thrown open to the public. The effect was, that not more than 200 or 300 attended the political meeting, which entirely failed; and scarcely a dollar's worth of damage was done to the gardens or to the public institutions by the working people, who were pleased with their share of the entertainment. A farther effect produced, was, that the charges before the police, of drunkenness and riot, were on that day less than the average of that on ordinary days.

Ablution and Bathing.—As relates to *cutaneous purification*, personal cleanliness ought to be regarded in the light

of a sanitary measure of the first importance, and to come within the category of the cleansing of streets and houses. It does not engage attention to the extent that its importance demands, whether we look to health or comfort. The neglect of cleanliness by the colliers of Lancashire, as recorded by Mr. Chadwick in his Report, is, we fear, not without a parallel, either among the same classes elsewhere, or among many others in better circumstances, but whose skin does not tell the tale to the eye so forcibly as if it were blackened by coal-dust. Neither the men nor the girls employed in the coal-mines ever washed their bodies. "Their legs and their bodies, said a witness, are as black as your hat." One laborer remembered that a particular event took place, because it was then he washed his feet. The effects of these habits are seen in the work-house, in almost every pauper admitted. When it is necessary to wash them on their admission, they usually manifest an extreme reluctance to the process. Their common feeling was expressed by one of them, when he declared it "equal to robbing him of a great-coat which he had had for many years."

How many of those who walk our streets, in gay attire too, wear a garment of this kind over their skins? If the external surface of insects be covered with oil, so as to stop up their spiracles, and the skin of animals of a higher grade be covered by a layer of some impermeable substance, death results. It needs little physiological knowledge to make us aware of the injury done to the functions of a human body, by the skin being coated for years with the secreted, oily, and perspirable matter. The lungs, to which the skin is auxiliary, must be overtasked in consequence, and rendered more liable to disease. That distressing, and too often unmanageable affection, albuminuria, or Bright's disease, is not unfrequently traceable to the imperfect performance of the functions of the skin.

"It might savor of caricature," says Mr. Martin, one of the Commissioners on the Health of Towns, &c., "were it asserted that in regard to the laboring poor, it is only when the infant enters upon breathing existence, and when the man has ceased to breathe, at the minute of birth, and at the hour of death, that he is really washed; yet such a statement would not be so far removed from the truth as it may at first appear. To the great mass of the people, and from dawn to the term of life, the bath, as an article of comfort, luxury, and health, is hardly known, even in name. In the chief cities of the United States a better, and in some of them an abundant supply of water, allows of the inhabitants having bath-rooms in their houses, for the purpose of cold-bathing; and within these few years past, the increase of kitchen ranges and boilers attached, allows of the use of a warm-bath. But the multitude, the masses of our population, both in town and country, are still wanting in these means of promoting health and enjoyment; and we have ample cause for imitating, by our own municipal governments, those in England, which, aided by the benevolence of individuals, have set about the erection of public baths. These, if not actually allowed to be used by all applicants gratuitously, are accessible on the payment of a very small sum.

As yet, the people of Christendom are behind the ancients, particularly the Romans, and even the semi-civilized inhabitants of different countries at the present time, in the general resort to the bath, and the readiness of access to this comfort and solace by the people at large. Your reporter would venture to refer to a work of his (on Baths, &c.), for a variety of details on the subject of bathing, as a part of public hygiene. Warm as well as cold water should be introduced into all bath-houses, both for the purpose of more complete ablution and detersion of the skin of all adhering impurities, and on account of the differences in individual sensibility and vigor of frame,

either constant or connected with temporary indisposition and weakness, short of actual disease. Warm baths might be supplied to the working-classes, Mr. Hawkesby thinks, at the low rate of about six cents each, if taken by 200 or 300 daily. By Sir Henry Dunkerfield's Act, the Parliamentary standard charge, for a warm-bath, is fixed at two pence (four cents), and when the bathers are in reasonable numbers, this sum is represented to be quite sufficient to give a profit beyond expenses. Dr. Reid, in his report to the Commissioners, in which he describes the means of ventilating different kinds of buildings, mentions the advantage of a limited supply of water being procured, "during the progress of the steam-bath, rendering cleansing, and the use of the flesh-brush, much more convenient than in the ordinary water or vapor-baths."

It has been calculated that the waste-water of a steam-engine of 500 horse-power would, at an average temperature of 70 to 75 deg. F., suffice to bathe 26,000 persons. A new source of an abundant supply of water, of a somewhat elevated temperature, adapted to personal and domestic wants, has been opened of late years in Artesian wells. The most remarkable of these is the one at Grenelle, near Paris, which, from a depth of nearly 2000 feet, sends up a volume of water equal to 132,000 gallons every twenty-four hours, at a temperature of 82 deg. F. Its softness and temperature adapt it admirably to the purposes of a bath and of washing clothes, for both of which it is largely used.

Public Wash-houses.—One of the marked improvements in public hygiene of late years, and which bears evidence that the spirit of philanthropy is abroad and active, is the establishment of Public Wash-houses, to which women of the poorer classes can go, and have the use of rooms, and all the appliances for washing and drying their clothes and those of their families, on the payment of a very small sum. The trials so far, made

in England and different cities of this country, have been quite successful, and promotive of much good and comfort to the parties for whom these houses are opened. Incidental but very decided benefit to the women who make use of the conveniences thus offered, is enjoyed in the avoidance of the dirt and litter, and confusion and disturbance to the whole family, on a washing day, in their own small and confined rooms.

An improvement, or rather an exceedingly useful addition, has been made to the original plan, by the procuring of large, airy rooms in which the infant children of the wash-women who come to wash their clothes, stay, and are watched and nursed by a person employed for the purpose. And yet a step farther has been taken in the way of present as well as future good to these juveniles. It is teaching them the simple elements of learning and morality.

NUISANCES.—A few words may be said on the present occasion in regard to nuisances, a term which in the minds of many has an entirely too limited meaning for the cause of public health, while, on the other hand, some of the more sensitive and exacting would extend the list to an almost indefinite extent. Under the general head of Nuisances are included special obstructions to the public health, such as accumulations of dung and offal, pig-sties, open privies, obstructed drains, pools of stagnant water, noxious smoke and other matters coming from manufactories, and especially the animal refuse invariably found in the vicinity of slaughter-houses, all of which act with so much power in the midst of a dense population. By an Act of Parliament, passed some years ago, aggrieved parties can, by an easy course, procure a removal of evils, when duly specified. The Nuisance Removal and Disease Prevention Act, passed in 1848, with the Amended Statute enacted the following year, are great steps in the way of sanitary reform. They constitute, together with the *Public*

Health Act and the *Interment Act*, a good beginning in a course of wise sanitary legislation, which has already done much toward an amelioration of the great and many abuses by which the public health in England had suffered so much.

French sanitary legislation is more precise, and at the same time, comprehensive, on the subject of nuisances. It distributes into three classes all establishments which are adverse to the comfort, health, and safety of the inhabitants; and it describes in what manner each is unhealthy and annoying.

Establishments of the first class cannot be allowed in the vicinity of private dwellings, and their erection is only permitted by a decree of the sovereign council. To this category belong the manufacture of sulphuric, hydrochloric, and nitric acids, as well as that of various chemical products, melting establishments of fat on open fires, work-shops for the preparation of taffety, leather, and varnished tissues, also of knackers, tripe-men, and cat-gut manufacturers, and of those in which are prepared animal black, glue, Prussian blue, blood-manure, *aiselle* (a kind of dye), and starch, factories of fire-works, lucifer matches, and fulminating compounds. The reasons for placing these together, as the most dangerous class, are vitiation of the air by the disengagement of emanations inimical to health, the risk of fire, and the intolerable odors which they emit. Hence, if allowed at all, it is only within a radius of three thousand feet, after long and multiplied formalities, which want of time prevents us from introducing in this place.

The second class of establishments of the manufacturing kind include those the removal of which from an inhabited district is not absolutely necessary, but which it is fit should only be permitted after a suitable inquiry to show that they are not nuisances. To this category belong lime or plaster kilns, when they are in constant operation, high-pressure steam-engines, gas-works, currieries, tanneries, hat factories, foundries, manufactories of sulphate of iron and zinc, of sulphate of

soda in close vessels, phosphorus, imitation jewelry, bituminous matter, chandleries of tallow and of stearine, and workshops for the scraping and cleaning of copper vessels.

None of these can be called actually unhealthy to those in their vicinity, but many of them are disagreeable, and seriously annoy others by their smoke, their noise, the danger of fire, or by their offensive smell.

The third class comprises all those establishments which may be in operation in the vicinity of dwelling-houses without inconvenience, but which must nevertheless be submitted to the inspection of the Prefect of the Department, for his authorization. They are, lime and plaster kilns, used not more than a month in the year, brick-yards, potteries, and tile works, manufactories of gelatine and isinglass, crucible foundries, dye-works, &c.

There is nothing absolute in this classification, inasmuch as that a particular manufactory, the processes of which are improved, may pass from one category to another.

Considering the excessive annoyances from the smoke, especially from the burning of bituminous coal, in large cities, such as London, and some of our own on this side of the Atlantic, it becomes a measure of the first importance, as a question of public health, connected with its effects on the lungs, by its being constantly breathed, and on the skin, in relation to personal cleanliness, and to the interiors of houses, on the score of domestic cleanliness, to discover the means by which the evil can be materially abated, if not entirely neutralized. Experiments with more or less success have been made with this view, the precise results of which, or their relative value, need not be introduced here. Too much importance has been attached to the mere effect of lofty chimneys in removing to a distance and diluting the heavy smoke and noxious fumes which are evolved from many manufactories. In themselves

they in no way destroy the emanations which are conveyed into them; these are discharged as much as before into the external atmosphere; and experience has proved that even very lofty chimneys, on which large sums have been expended, do not necessarily insure that amount of admixture with the common air which is essential to prevent the most injurious consequences of their deposit, even at very considerable distances. The extent to which nauseous, acrid, and other noxious fumes from manufactories often destroy the atmosphere of numerous dwellings, and sometimes of whole streets, is abundantly explained in the reports of the Commissioners.

Slaughter-Houses.—These nuisances, of the worst class, were clung to in England and elsewhere, with a tenacity such as might imply a thorough conviction of the use of them being a time-honored privilege, interwoven with the dearest rights of the people. The last and decisive battle of old prejudices against the clearest evidences of hygiene, was fought in the matter of the Smithfield Market and its shambles, in the very heart of London. We cannot introduce the subject better than by giving the following portion of Abstract of Evidence before the Select Committee of the House of Commons on Smithfield Market, May, 1847.

Dr. Jordan Roche Lynch had lived and practised for the last fifteen years in the neighborhood of Smithfield, the sanitary state of which was most defective. The slaughter-houses have a most injurious influence upon the district; they generate fever, and render the most simple diseases malignant, and shorten the duration of life. In Bear alley, a lane running from Farringdon street to the old wall of London, called Breakneck Steps, there is a slaughter-house behind six or seven houses, which are inhabited by the humblest classes of society. The stench is intolerable, arising from the slaughtering of the cattle, and the removal of the fecal matters, the guts, the blood, and the skins of the animals.

When they clean the guts, the matter is turned out ; some of the heavier parts of the manure are preserved to be carted away, but a great deal of it is carried into the sewers, which have gully-holes ; and in the summer months, the heat acting upon the fecal matter causes its decomposition ; and carburetted and sulphuretted hydrogen gas, and carbonic acid gas, all of which are fatal to animal life, are disengaged, and rush out of the gully-holes, so that a blind man's nose will enable him to avoid approaching these outlets. Whenever he goes into places or houses contiguous to the slaughter-houses, he is compelled to hold his nose all the time he is there, the stench is so great. Dr. Lynch has patients in all these houses. They are never free from the effects of this stench, and when the people there are dangerously ill, he is without the hope, by any exercise of skill, of restoring them to health. He invariably makes it a rule to entreat them to conquer their repugnance to go into the Work-house, in order that they may have better air ; and if they accede, the medicines that would have failed in the noxious atmosphere before, restore them, in most instances, to health.

The people where such smells are, drink ; it is a kind of instinct ; they fly to it ; they fancy that the stimulus resists the noxious agency of the foul air they are breathing. Malaria, such as is generated in these slaughter-houses, is a narcotic poison ; it oppresses both body and mind ; and under the influence of this physical and mental depression, they instinctively resort to the gin-shop, which aggravates their distresses, by extracting from them the means of living perhaps better than they do, and it might have been added, also, by the addition, in this way, of one poison to another.*

Mr. Dunhill, civil engineer, who made the abstract from which we have been borrowing, relates also, that in Newgate and Leadenhall markets, the slaughtering was carried on in

* Journal of Public Health, vol. i., p. 244.

cellars, where there was a total absence of natural light, ventilation, or drainage; the blood and dung being sometimes allowed to accumulate therein for months together, or until the pestiferous effluvia caused sufficient alarm and sensation in the neighborhood to originate an indictment. The water supply was utterly inadequate, and was obtained from the most impure sources, while the machinery was of the most primitive and imperfect character. In Aldgate (better known as Whitechapel) Market, the open kennels and water-tables of the wood-way are to be seen almost daily streaming to overflow with blood and ordure. Immense quantities of skins, offal, and dung, were also exposed on the public highway, where thousands of pedestrians were continually passing to and fro.

We have spoken of these nuisances in the past tense, under a belief that they have been abated, if not entirely removed. Smithfield Market has been finally closed.

Some of the witnesses before the Commons Committee, spoke in high terms, from personal observation, of the French abattoirs, which form a striking contrast to the English slaughter-houses. Mr. Dunhill, on this point, remarks: "In Paris, the influence of cleanliness, supervision, and facilities for performance of the duties of the slaughtermen, was very interesting to observe. Their demeanor was characterized by none of that brutality, apparent relish for cruelty, and indifference to the dirt, filth, and disgusting scenes, which those of our own country witness and participate in every day of their lives. Not the least important feature in the establishment of outlying abattoirs is, that bone-boiling and crushing, skin-dressing, glue, gut, horn, and manure-manufacturing, with numerous other noxious crafts in connection with the offal and refuse of slaughter-houses, highly prejudicial to the public health, and intolerable nuisances in the crowded districts, where they are now carried on, would very soon

find their location outside the town, in the neighborhood of the depots of the *materiel* which they require."

When the public abattoirs in Paris were completed, they were handed over to the use of the butchers, and all private slaughter-houses were suppressed. Two indispensable conditions have been laid down for making use of an abattoir—first, a copious supply of good water; and secondly, complete arrangements for its being carried away after having been used in the various processes of slaughtering the animals, and in the washing and manipulations of their several parts. Where the water cannot be brought by hand, it must be pumped up by steam-engines. It has been computed that a single abattoir in Paris requires about 45,000 gallons of water daily. The sewers for the carrying off the waste and impure water, are either special, and open directly into the Seine, or communicate with public sewers, which have a uniform fall towards the river. Trials were made, but unsuccessfully, of large pits filled with calcareous stones, for the reception of the waters coming from an abattoir, and also of open drains to convey the waters to the Seine. Finally, an absorbing Artesian well, 570 feet deep, was bored, and in this opening all the bloody and saline water of the abattoir was allowed to flow. The absorption went on at a uniform rate, and without the escape of a single drop of the inflowing water, or of any odor, either inside or external to the establishment.

In the public abattoirs, a supervision can be, and is exercised over the health of the cattle that are brought to be slaughtered. None are allowed to be killed in them which are laboring under contagious disease; nor can the animals affected with other diseases be slaughtered without the consent of the inspectors of the abattoir.

Cow-Houses.—These have become of late years regular establishments in nearly all large cities. Though not directly

nor necessarily coming under the head of nuisances, yet incidentally and too frequently they are made such. The subject is doubly important—first, as it relates to the contamination of the surrounding air, by a failure to remove the excremental matters from the stables, and to keep them clean; and secondly, by the bad milk obtained from cows pent up in stables in which ventilation is not attended to. Of the deleterious food given to these animals when kept in stables in a city, and of the consequent bad health and diseases, especially among the infantile portion of the inhabitants of a city, we have already spoken.

Cow-keeping did not elude the vigilance of the French government. The regulations which exist have for their object, to prevent overcrowding of the animals, to insure cleanliness, and a sufficient ventilation of the stables. It appears, from a report of the Metropolitan Medical Officers of Health on London cow-houses, that there are in that metropolis 846 of these establishments, containing 11,818 cows. The Committee, in conclusion, offer the following rules for the regulation of cow-houses:

1. Every cow-house shall be paved with flag-paving or other non-absorbent material, set and bedded in cement, with a proper inclination to the foot of the stalls, so as to drain into a channel leading, by a fall of not less than one and a half inches, or ten feet in a trapped gully.
2. Every cow-house will be provided with a proper trapped drain, to convey fluid matter alone into the sewers.
3. Every cow-house shall be furnished with an adequate supply of water, and be washed thoroughly at least once a day.
4. All solid manure and refuse shall be carefully swept up twice a day, be kept under cover, and be carted away every morning by seven o'clock from Lady-day to Michaelmas, and by eight o'clock from Michaelmas to Lady-day.

5. Every cow-house shall be kept in proper condition, and the walls be lime-washed at least four times a year, within fourteen days after the quarter.

6. Every cow-house shall have at least 8 feet by 4 feet for each cow (when the cows are kept in separate stalls), or of 8 feet by 7 feet for every two cows (where the stalls are constructed to hold pairs), with a cubic capacity, in either case, of at least 1000 feet to each cow; shall be properly lighted and ventilated, and when the state of the neighborhood requires it, shall be provided with tight roofs and ventilating shafts, so as to convey the noxious exhalations above the level of the adjacent houses.

7. Every yard in which a cow-house is situated, shall be well paved with stone, or other impervious material (the joints of the paving to be run with grout), with such a slope towards the channels and trapped gully, as to permit the rapid escape of all fluids into the sewer, and shall be washed at least once a day.

8. The grain-bins and receptacles for wash, shall be kept properly cleaned, and under cover.

9. No underground cellar, and no part of a dwelling-house, shall be used as cow-sheds.

Among the most grievous nuisances to which many neighborhoods have been subjected in London and other large towns, is burial-grounds not adequate for complete sepulture. Indeed, the practice of intra-mural interment, that is, of burial of the dead in a densely populated part of a city, must altogether be regarded in the light of a nuisance. It is not necessary to enlarge on this subject, as it has been made one of separate investigation by your reporter, and as such it is now offered to the Convention as the completion of his labors at this time.

INTERMENTS IN CITIES.

There yet remains one important branch of sanitary reform, bearing on the public health, to which attention must now be directed. It is interment of the dead in city limits. Turning to present account the materials which, as chairman of a committee appointed for the purpose by the Philadelphia County Medical Society, your reporter collected and presented to that body, he now offers this document, with some additions, as a contribution, on the part of the Committee on the Internal Hygiene of Cities, to the Quarantine and Sanitary Convention.

The practice of intra-mural interments, or of those within the limits of a city or town, and especially in those parts of it in which people are congregated in numbers for fixed habitation, is always dangerous to the public health. It has caused, in numerous instances, sudden death; and to a still greater extent, it has been productive either of fatal disease, or of a slow decay of the powers of life, and a breaking down of the constitution. Enlightened legislation, from the earliest times, has endeavored to prevent, or if this could not be done, to mitigate the evils attendant on interments in cities and towns. Sometimes a religious sanction was given as the means best adapted to attain these objects. This was the case in ancient Egypt, in which, owing to the nature of the soil and the annual overflow of the valley of the Nile, inhumation could not be performed in a proper manner; and hence the universal resort to embalming the dead, which came to be regarded both as a religious and a hygienic measure. The bodies thus prepared were afterwards deposited in grottos and in chambers excavated from the rocks, the walls of which were covered with bas-reliefs and fresco paintings, descriptive of the trades and other occupations of the deceased. The Etruscans, to whom Rome was indebted for her ritual, her first sanitary regulations, and the construction of the great cloaque, took

wise precautions against the dead being a cause of disease and of terror to the living, by arrangements for sepulture on such a scale, that in their excavated cities of the dead, the traveler, at the present time, sees sepulchral chambers so ample and decorated, as to persuade him that he is actually in the houses of the former inhabitants

In the primitive ages of Greece, the inhabitants buried their dead in depositaries prepared for the purpose in their own houses; and vaults in temples were sometimes used in this way. But with the progress of refinement and better knowledge, the custom afterwards prevailed of carrying the dead without the cities, and interring them chiefly by the highways. Lycurgus, in this, as in most of his institutions, differed from the rest of the Greek lawgivers, for he allowed the Lacedemonians not only to bury their dead in the city, but also around their temples. His object was to remove from the minds of the youth the fear of a dead body, as well as to destroy the superstitious dread, that treading on a grave or touching a dead body would defile. Burning the bodies of the dead became general among the Greeks, from whom the Romans afterwards borrowed the custom.

The ancient Jewish cemeteries were commonly situated beyond the limits of cities and villages. It was, indeed, the custom among other nations of the East as well as among the Hebrews, to bury out of the city, except in the case of kings and very distinguished men. The Hebrews generally exhibited a preference for burying in gardens, and beneath shady trees. Large subterranean places of interment were frequently to be found in Palestine: in some instances they were the work of nature; in some they were merely artificial excavations of the earth, and in others were cut out from rocks. Numerous sepulchres of this kind are still found in Syria and also in Egypt. Examples of these subterranean quarries, used probably for the same purpose, are seen at

Marsala (the ancient Lilybæum) in Sicily, Syracuse, Salerno, Malta, and, in the north at Maestricht, &c.; and perhaps, adds Mr. Burton,* the celebrated labyrinth in the island of Crete was formed originally by excavations of the kind. But by far the most remarkable are those discovered of late years by Laborde, in the remains of the large and wealthy city of Petra, the ancient Edom. They are of incredible number and extent, and of various forms and dimensions. Some of them are houses and palaces; but the greater number are tombs and the like sepulchral monuments. They not only occupy the foot of the entire mountain by which the valley is encompassed, but the ravines and recesses which branch out from the inclosed area. Ranged in regular order, like houses of a well-built city, they would extend, we are told by the Rev. Dr. Olin, who visited the place, not less than five or six miles in length. The façades of many of these rock tombs are decorated with great architectural and sculptural beauty; the more striking on account of the utter solitude and desolation in which they are found.

The Carthaginians buried their dead at some distance from the city. The Necropolis was situated beyond the suburbs, or the new town, Megara, as it was called, which, itself, was made up chiefly of gardens intersected by canals for the purpose of irrigation.

In the brightest or the republican period of the history of Rome, down to the time of Sylla, the ordinary method of inhumation was practised in either public or private places. The private were in fields and gardens, often on the sides of the most frequented roads, so as to attract the notice of those that passed, and it may have been also to remind them of their mortality. Hence the frequent inscriptions on the tombs: Stop, Traveler; Behold, Traveler, &c. (SESTE VIATOR; ARPICE VIATOR), seen on the Appian, the Aurelian,

* Description of the Antiquities and other Curiosities of Rome

the Flaminian, and other roads. Public places, such as the Campus Esquilinus outside the Esquiline gate, were granted by the Senate for poor people. The vast accumulation of the dead at this spot rendered the neighborhood so unhealthy, that Augustus, with the consent of the Senate, gave part of it to his favorite Mæcenas, who built on it a magnificent house, and surrounded it by extensive gardens. The Roman law was very decided in its prohibition of the burial of the dead within the city; and only in a few exceptional cases was any relaxation permitted. The vestal virgins and some illustrious men were favored in this way. The right of sepulture for himself within the pomerium, or open space left both within and outside of the walls, was decreed to Julius Cæsar, as an unusual privilege. By the emperors the original law was enforced with a severity which was rendered the more necessary by its frequent infractions on the part of the people, who believed the worship of their household gods and the manes of their ancestors to be more acceptable in the vicinity of the dead. Adrian decreed the confiscation of the land on which a tomb was reared within the city limits, and the exhumation of the body which had been buried.

Burning the bodies of the dead, of which mention is made in the laws of Numa and of the Twelve Tables, did not become general until towards the end of the republic. Under the emperors the custom was almost universal, but it afterwards gradually declined on the introduction of Christianity, and fell into disuse about the end of the fourth century. The Romans prohibited both the burning and the burial of the dead in the city; in the former case in order that houses might not be endangered by the frequency of funeral fires, and the air contaminated by the stench arising from them. The Senate House, contiguous to the Forum, was burned by the flames extending from the funeral pile of Clodius.

The canons of the Christian Church, in imitation of the

civil law, were opposed to interments in cities, and also in their churches, but with indifferent success. The pernicious examples set by the Emperor Constantine, who, in pursuance of his expressed wish, was buried in the vestibule of the Basilica of the Holy Apostles at Constantinople, and by Honorius, who found a sepulchre in the portico of the Church of St. Peter's, at Rome, soon had numerous imitators among the patricians and great officers of the state. Vainly did succeeding emperors forbid intra-mural interments, and endeavor to restrict the privilege to martyrs alone. Mistaken piety, superstition, and the vanity of the rich and the powerful, prevailed over imperial edicts, and before the sixth century there were not only numerous interments in towns, but the practice of sepulture in churches was also on the increase. The monks obtained permission to be buried in the cloisters of their convents, and the founders of churches procured for themselves the same privilege. Charlemagne, toward the close of the eighth century, seconding the wise reform of these abuses begun by Theodolphus, bishop of Orleans, prohibited the burial of the laity in churches, and eventually of all persons whatever. But the evil was not arrested, although attempts were made with this view by numerous great councils of the Catholic Church, held in different parts of Europe, from the beginning of the ninth to the latter part of the sixteenth century. Why prohibitions, enjoined under such solemnity, were so long and so extensively disregarded, may be understood for the reasons already assigned. To these should be added another and constantly nullifying cause, viz. : the cupidity of the clergy, who derived large fees for the permission which they granted to bury in churches or contiguous porticos ; and this often in despite of positive enactments by some of the councils against such abuses. Even somewhat less than a century ago, or in 1765, the Parliament of Paris, disregarding the remonstrances of the physicians, who had called the attention of the government to the danger of intra-mural burials,

continued the permission to the clergy to be interred in the churches. It was not long, however, before the clerical body, animated by a more enlightened spirit, gave up privileges which were productive of so much danger to the public health; and at the present time the traveler has an opportunity of admiring the numerous and tastefully-arranged suburban and rural cemeteries in France, Italy, and Germany, which have replaced the crowded and often closely body-packed and noisome grave-yards and church-vaults in the central parts of the cities.

The practice by the first Christians of interring their dead in the city of Rome, grew out of the peculiar circumstances in which they were placed as a persecuted sect. As such they were compelled to hold their religious meetings and to celebrate their rites at night, and in retired and obscure spots; and for this purpose no places were better fitted than the subterranean caves and passages known ever since as the Catacombs. There they met to worship, there they baptized their children and neophytes; and in many instances they deposited their dead in excavations made in the sides of these numerous galleries and avenues. These excavations were originally begun, and must have been carried on to a great extent for the purpose of procuring building materials. How far they were increased by the primitive Christians in Rome, is a matter of doubt. The length of these subterranean streets, in different directions, and taken altogether, has been estimated by late investigators at about nine hundred miles. According to Father Marchi, the Roman Catacombs may be believed to contain the prodigious number of nearly seven millions of graves. When Christianity came to be tolerated so as to admit of freedom of worship in the open day, grants of pieces of ground for the burial of the dead were made by converted publicans and Roman leaders, and thus were begun the intra-mural cemeteries, with their chapels, which, in process of time, became parish

churches. Some of the cemeteries of the rural parishes were after a time comprised in the limits of the city by its subsequent extension. The history of the quarries in the tufa hills, near Naples, is similar to those of Rome: both of them supplied building materials, and both were converted into catacombs for Christian worship and burial. In the first centuries after the Christian era, so far was interment in churches from being allowed, that the presence of a solitary tomb was deemed to be sufficient cause for preventing the erection of a house of worship. The cemeteries, however, were soon placed, probably by the terms of their original grants, under ecclesiastical jurisdiction, and continued to be so during the middle ages, and as low down as the middle of the sixteenth century. It was owing to this circumstance that sanitary reforms, which seemed to be of a purely mundane value, were so slow in being brought about. In modern times, the subject of the control of cemeteries is properly viewed as a municipal affair, and as such it ought to be studied and regulated with an eye solely to the public good.

It is not necessary to enlarge on the terrible penalties which result from a neglect of the natural laws, established on an unchangeable basis, by the Deity himself, nor to present in detail the loss of life, and in other respects wide-spread injury to the public health, caused by an infraction of these laws in the long-continued custom of interments in churches and in grave-yards within city limits. Medical men have never ceased to protest against it, and to point out the evils, sometimes amounting to frightful catastrophes, from its continuance. In some instances these results were caused by the escape of pestiferous air from recently-opened vaults in churches; in others by its extrication on a larger scale, and with more concentrated virulence, from the earth of old burying-grounds, which had been turned up with a view to their being occupied for other purposes. The efforts of Navier to

enlighten the people of the government of France on the subject were so far successful, that a royal decree was issued in the following year (1776) limiting the privilege of sepulture in churches to some of the higher dignitaries in church and state. In a small tract written a few years (in 1768) before this time, the author anticipated many of the views and suggestions put forward of late years by Mr. Chadwick. Vicq d'Azyr ten years later, yielding to the solicitations of his friend D'Alembert, snatched time from his profound studies and experimental observations in anatomy and physiology, to translate a volume from the Italian of Scipio Patioli, on the subject of the selection of proper places for interment, and the dangers resulting from a neglect of the observances required on the occasion

Within the last few years the attention of the people of Great Britain has been thoroughly aroused to the enormities of intramural interments, especially as witnessed in London, by the labors of Walker and Chadwick. One cannot read without feelings of sickening and disgust, the details of the state of some of the grave-yards of the metropolis; and it must be a matter of surprise to every reflecting mind, that such scenes as are exhibited in the pages of these writers should have been so long tolerated by any people pretending to civilization, or possessed of ordinary sensibility and intelligence. In a report on extramural sepulture by the General Board of Health, it was stated that "there could not be less than two hundred, and probably more, burial-grounds in London, situated at various distances from each other, and each differing in extent. These constitute two hundred centres of more or less pollution, each pouring out unceasingly, day and night, its respective contribution of decaying matter, but the whole together, reckoning only the gas from decomposing human remains, amounting, as we have seen, in one year, to upwards of two million and a half of cubic feet. Whatever portion of these gases is not ab-

sorbed by the earth—earth already surcharged with the accumulation of centuries—and whatever part does not mix with and contaminate the water, must be emitted into the atmosphere, bearing with them, as we know, putrescent matters perceptible to sense. That these emanations do act injuriously on the health of the people resident in the immediate neighborhood of the places from which they issue, appears to us, by the evidence that has been adduced, to be indubitably established. From the law of diffusion of gases, they must be rapidly spread through the whole of the atmosphere that surrounds the metropolis, and though they thereby become diluted, and are thus rendered proportionally innocuous, yet that they do materially contribute to the contamination of the air breathed by two millions of the people, cannot, we think, admit of reasonable doubt. We submit, therefore, that a case is made out for the total prohibition of interments within the metropolis, on account of the injury resulting from the practice to public health." The argument of the General Board of Health was a convincing one, and it led to the Interment Act of 1850, the passage of which was probably facilitated by the favoring influence of the clergy of the Established Church, headed by the Bishop of London. Evidence was adduced by the Board of Health, to show that severe complaints in the vicinity of some of the church-yards, almost invariably prove fatal; and also, that the pestilential atmosphere thus formed became a fit radius for the poison of cholera during the fatal year of 1849.

But the exhalations into the atmosphere are not the only evils. Mr. George A. Walker had shown, years before, that the fluid portions of the decomposing body pass into the earth, and together with resulting gases, percolate through the walls of houses and drains, and find their way into gully-holes, and thence into the air of the streets. It is not improbable that legislative action was quickened (in the case of the Inter-

ment Act) by the annoyance to which the members of the House of Commons were exposed from a stench exhaling from gully-holes in the neighborhood. M. Gallo, the surveyor, declared it to be produced by the percolation of gases and animal compounds from the over-charged church-yard of St. Margaret's, immediately opposite. Mr. Walker, in a letter to the "editor of the *Journal of Public Health*," in which he had stated this fact, writes, in addition: "I have frequently demonstrated that a *single inspiration* of the products of human putrefaction has, in innumerable individual and collective instances, instantly destroyed life; in others produced lingering consumption, typhus, scarlet fever, &c., &c., whilst in other cases ruined health and crippled usefulness have been the clearly traceable consequences resulting from exposure to human remains in a state of decomposition." A case related by Mr. Chadwick, and which came under his own observation, may be related here, as serving to point the moral of a longer history in the same vein. In one of his walks with Professor Owen, he met with a butcher, who, in reply to some inquiries about his health, stated the following particulars. This man had lived a long time in Bear yard, near Clare market, where he was exposed to two deleterious influences—shambles on one side and a tripe-house on the other. His attention to his own impaired health, under such circumstances, was quickened by observing that it was impossible for him to keep birds, of which he was extremely fond, in this place. "You may hang up a cage," said he, "in any window of the corn-houses round Bear yard, and not a bird will live out the week." What most annoyed them among the congregation of odors, was the vapor rising from the fat in the process of preparing the tripe. Some time before this, he had occupied a room in Portugal street, overlooking a crowded church-yard, from which he often saw a dense vapor rise, that had a very offensive odor. The butcher's

birds died there in brief time, and the good man found that he could only preserve new purchases by removing his quarters to Vere street, beyond the range of deleterious emanations.

Among the many wise laws enacted for the benefit of the people by the government of the republic, after the subversion of the monarchy in France, were those relating to interments. By a decree of the 23d prairial, in the year XII. of the Republic (12th June, 1804), burial in churches, temples, synagogues, and all other edifices devoted to religious worship, or in the limits of any city, town, or village, was prohibited; and, at the same time, provision was directed to be made for interring the dead in cemeteries beyond town limits. It was decreed in 1808, under the empire, that there should be no dwelling built, or well dug, within 125 yards of the new cemeteries. In Prussia, the distance of cemeteries from towns varies from 100 to 1000 yards. Some English writers recommend an interval of six to seven hundred yards between the two. The French law requires that five years must elapse before the same grave can be opened for a second interment, so that time may be allowed for the decomposition of the body first inserted, before another is deposited in its place. In the case of the city of Marseilles, with a population of one hundred thousand inhabitants, and an annual mortality of three thousand persons, it has been estimated that six thousand square metres, or about six thousand five hundred square yards of ground, would be required for the purpose of interment during a single year; assuming that to each body, separately, to be buried, there ought to be allowed a space of two square metres, or six and a half square feet. But as five years must elapse between successive interments in the same spot, the entire extent of ground necessary for the burial wants of a population of one hundred thousand persons, is thirty thousand square metres, or about thirty-two

thousand five hundred square yards. Various estimates have been made of the time that must elapse before the entire decomposition and destruction of the body, leaving only the skeleton or the bones entire. Some, like Gmelin, make the period thirty to forty years; others, with Walker, at seven years; Orfila, again, found, by actual experiments instituted for the purpose, that a body, even when inclosed in a coffin, would, after interment, be reduced to the state of a skeleton in a period varying from fourteen to eighteen months. Much, in all these calculations, must depend on the nature of the soil in which interments take place. The legislation on the subject of the time that should intervene between the deposit of dead bodies in the same grave also varies. In Hesse Darmstadt, and in Prussia, an interval of thirty years is exacted; in the city of Leipsic, fifteen years; in Milan, ten years; in Munich, the capital of Bavaria, nine years. The law in France, as above stated, may be considered as meeting the exigencies of the case. Much less difference occurs in the enactments prescribing the depth of the grave opened for the reception of a dead body. In most countries, including Russia, this is somewhat more than six feet; in Frankfort on the Main, it is four feet seven inches; and in London, the bishop used to direct a depth of between four and five feet.

Danger to the public health does not end with the permanent closure of a cemetery, and by the discontinuance of burial within its limits. Years must elapse before the soil can be broken up for other purposes, such as the construction of houses or the digging out of trenches or drains. It has been found that the soil of a burying-ground, in which a succession of bodies in large numbers has been laid, becomes in process of time, unfitted to bring about the putrefactive changes in bodies of more recent deposit, so as to render them, in a great degree, innocuous. The soil, under such circumstances,

becomes saturated, to adopt language of recent introduction, as applied to this subject, and animalized to such a degree, that it cannot be disturbed without exhaling poisonous vapors and gases, which, in many instances, have proved suddenly fatal to those who inhaled them. Vicq d'Azyr tells of the breaking up of the soil of an old cemetery in the heart of the town of Riom, in Auvergne, with a design to public improvement, which was followed, soon after, by an endemic disease, that carried off a large number of the inhabitants, particularly of the poorer classes; and it was noticed that the mortality was greatest in the neighborhood of the cemetery. A similar calamity, from the same cause, had occurred six years before, in a small town called Ambert, also in Auvergne. The spot on which had stood a convent of the Daughters of St. Genevieve, at Paris, was eventually appropriated for the erection on it of several shops. All the first occupants of these new shops, and especially young persons, suffered from diseases nearly of the same kind—effects attributed, with good reason, to the exhalations from the bodies of those who had been buried in this ground. M. Tardieu, to whose work—a Dictionary of Public Hygiene,* &c.—we are indebted for the preceding details, writes, that he has heard many of the old inhabitants who occupied houses near the church of St. Severus, in Paris, say, that when the weather was mild and damp, there arose from the ground, which had been used for so many centuries as a place of interment, a dense vapor, of such a sickening nature as to force them to close the windows, in order to escape serious consequences. Another incident to the same purport, which occurred also in Paris, is worthy of notice. After the memorable three days of July, 1830, great difficulty was experienced in procuring immediate sepulture for those who had fallen in the fight. A provisional inhumation of a certain number was directed to take place in the ground of the Market

* Dictionnaire d'Hygiene Publique et de Salubrité. 3 vols. Paris, 1854.

of the Innocents, the spot anciently occupied as a cemetery, in long use. A trench was accordingly dug, of about twelve feet in length, by seven in width, and ten deep. When the pavement was taken up, and a layer of sand of about six inches in depth removed, a dark and greasy earth was exposed to view, mixed with bones and remains of coffins, which it was necessary to break up. The exhalations arising, in consequence, were so fetid and poisonous as to suffocate immediately one of the workmen.

Taking into consideration the alarming and often fatal effects following the disturbance of the soil of old cemeteries, the first republican government of France enacted as one of the clauses of the law respecting interments, of which we have previously spoken, that no cemetery after its final closure, should be appropriated to any other purpose short of a period of ten years. Grass or grain might be sown in it, and trees planted, but no deep digging, or foundation for buildings should be begun, until permission was regularly granted for the purpose. Reference being had to the different opinions held respecting the time required for the entire decomposition of a body after its inhumation, it may be readily supposed that there would be corresponding differences in the legislative enactments in different countries, in regard to the period that ought to elapse before a cemetery, finally closed, could be used for any other than its original purpose.

If we appeal to chemistry for aid in detecting the *deleterious gases* given out from grave-yards, and more particularly from the soil after it has been dug, as in opening a grave, or from vaults in which the dead had been deposited, we learn that the gas most largely extricated is carbonic acid, and also carbonate and sulphurate of ammonia. Dr. Reid states, that in some church-yards he has "noticed the ground to be absolutely saturated with carbonic acid gas, so that whenever a deep grave was dug, it was filled in some

hours afterwards with such an amount of carbonic acid gas, that the workmen could not descend without danger. Deaths have, indeed, occurred in some church-yards from this cause." But chemistry still fails to enlighten us fully respecting the nature or composition of those subtle poisons called miasms, which under so many circumstances generate wide-spreading and fatal disease. The vitiation of the air of the hospitals, dormitories in barracks, and in crowded assemblies, is, to a certain extent, made explicable by a minute increase of carbonic acid in these places. As evincing the great penetrativeness of these miasms, Dr. Reid tells us that he has detected their escape from graves more than twenty feet deep.

The extent of the facts now collected respecting the evils attending the practice of interments in cities in different parts of the world, and the almost uniform course of legislation, both civil and canonical, prohibiting the practice, can hardly fail of being applicable to the actual condition of things in our own country. Looking at the large and increasing population of our chief cities, the dearness of ground, and the economy of building-space, now so carefully studied, every question relating to the public health becomes of more and more importance. All preventable causes which diminish the purity of the air, or vitiate it by the addition of deleterious gases and miasms, ought to be, as far as possible, withdrawn. The increase of rural or suburban cemeteries for the burial of the dead, has doubtless had a share in abating the mischief which universal experience shows to be the frequently incidental, if not constant effect of interments in its more crowded districts. It is desirable now to take a farther and final step, and to ask that the growing partiality for extra-urban cemeteries should become not only a common, but a universal custom, sustained and enforced by formal municipal enactment.

Several years since, the Sanitary Committee of the Board of Health of Philadelphia, made a report on this subject,

and offered a resolution, that in the opinion of the Board, interments of the dead within the densely populated parts of the city of Philadelphia and adjoining districts, ought to be discouraged. A carefully drawn bill, accompanying the resolutions of the Board, was sent to Harrisburgh for legislative action, but without effect. The period which has intervened between that and the present time has not diminished the evils complained of, nor rendered a reform less necessary; for the relief afforded by the voluntary extra-urban interments has not kept pace with the increase of population. The following language of the Sanitary Committee, just referred to, is as full of warning and monition to other cities as it is to the people and the municipal authorities of Philadelphia: "Your Committee are convinced that the grounds of our own metropolis are even now sources of danger to the health of our citizens, and that every year the danger resulting from these must augment. Scattered as they are over every neighborhood, surrounded by a dense and constantly-increasing population, and many of them already comparatively crowded with dead bodies, which are carelessly, and in many instances superficially interred, some of the grounds, particularly those belonging to the colored congregations, are, even now, decided nuisances, injurious to the health of the neighborhood in which they are located." Dr. Wilson Jewell, who has given much attention to public hygiene, does not hesitate to declare, after careful personal inspection and inquiry, that there is not a burial-ground in the thickly populated parts of Philadelphia, which has been in use during a period of fifteen to twenty years, which does not contain twice the number of bodies that the ground is capable of allowing to be decomposed; in other words, that it has passed its point of saturation. In some cemeteries in this city, it is no common thing to deposit three, four, and even five, bodies in one grave, until their decomposing remains reach within eighteen inches, and even a foot, of the surface.

There are grave-yards in the city, of modern date, which already show marks of being crowded with the dead; and although when first opened, they were on the borders of the city, and almost rural, they are now surrounded by streets, regularly built, which, ere many years have passed, will become densely inhabited. One of the cemeteries thus situated, and the first we believe laid out as a private speculation, a little more than thirty years ago, has received during this period, as Dr. Jewell was informed, upwards of 11,000 bodies. It occupies a space equal to one of our Philadelphia squares. Mr. White, some years ago City Inspector of New York, in his report for 1850, speaks pointedly of the nuisances of many of the grave-yards of that city. He had some of them closed during the prevalence of the Cholera in 1849. Under such circumstances, a sudden addition to the number of interments in these places, as in times of epidemic diseases, would not be without danger, and might give rise to catastrophes on a large scale, analogous to those which occurred in foreign lands, and some of which have been recorded in the present report.

Not having been required to investigate the whole subject of interments, we do not deem it necessary to specify the kinds of soil most favorable for the purpose of accelerating the desired changes in the decomposition of the body buried, nor have we inquired into the sanitary influence of plantations of trees in cemeteries, with a view to the purification of the air of these spots. We must not omit, however, referring to a plan recently suggested, and in some places carried into effect, in England. It is, to surround the bodies of the dead, before they are finally inclosed, with a layer some four inches thick of finely powdered *wood or peat charcoal*. By this means the decay of the animal textures would go on rapidly, and without giving rise to dangerous exhalations. In the burial of the poor this plan merits a favorable consideration, and it must in-

deed commend itself as worthy of adoption by all classes. The experiments of Dr. Stenhouse place the subject of the operation of vegetable charcoal on dead bodies in a new and instructive light, by showing, contrary to popular belief, that, although a deodorizing and disinfecting agent, it is not an antiseptic proper, which gives stability to organic matter, and prevents its decomposition. Charcoal, and, in less degree, clay, produce a species of slow combustion, by which the miasms are gradually consumed.

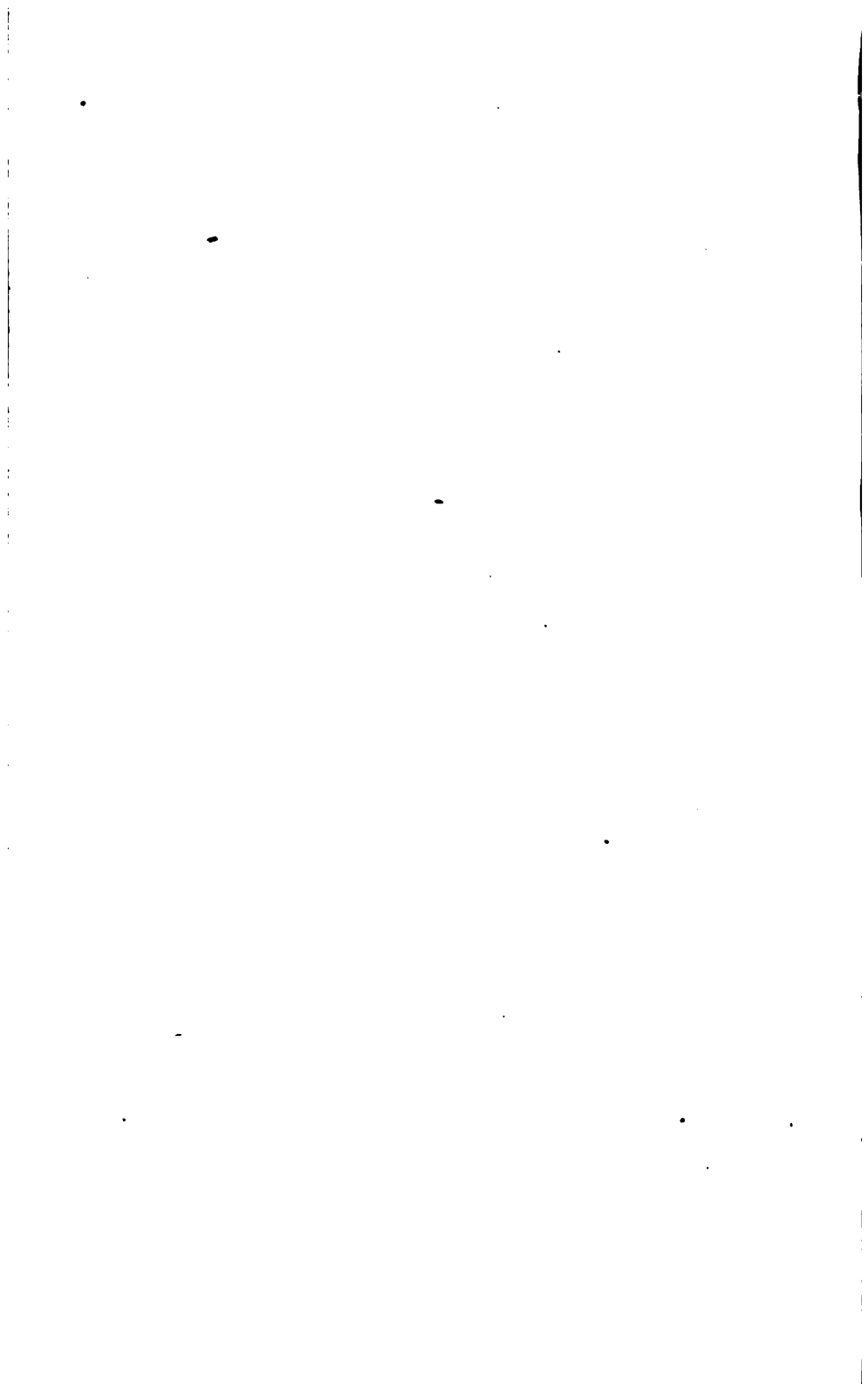
Without being called upon to look at the subject of intramural interments under its purely moral and religious aspects, we are nevertheless free to allude to the depressing, and in such times morbid influence, exerted on the community by its being compelled to witness the frequent, and in visitations of certain fearful epidemics, the almost continual succession of funeral processions. This is a matter of public health, in discussing which, medical testimony cannot be overlooked. Were it necessary, clerical experience could also be invoked in favor of suburban burials in preference to those in the city, whether regard be had to the desirableness of the uninterrupted solemnities of the burial service, the avoidance of whatever would grate on the already harrowed feelings of attending relatives and friends, and the preserving unbroken the associations of an elevated and religious character, with the sight of the memorials to the dead and of the spot where their bodies rest. * * *

There are yet other matters worthy of notice which might serve to show still further the importance and economy of sanitary measures to cities, and of which it would be desirable to treat. A topic of considerable moment in all commercial cities is the structure of the wharves, so that there shall be nothing in the materials of which they are made, susceptible of decay and decomposition. So also of quays in every town on the banks of a river,

and their construction so as to narrow the channel and diminish the exposed surface at low water on both of the sides of the river. One measure in the internal hygiene of cities ought to be a careful supervision of all stables, cow-houses, and piggeries, and vigilance in the removal of heaps of manure, accumulated under no matter what excuse. Ascending the scale of the duties of sanitary supervision, would come that of manufactories and of work-shops, which may be termed public, by their extent and the number of persons employed ; also of all buildings in which people assemble in numbers at stated times. Minute inquiries are made into the structure and arrangement of the rooms, and the number and plan of fire-places, furnaces, and stoves, before an insurance against fire can be effected. Why then should there be any hesitation about a similarly careful investigation by the sanitary authorities, with a view to insurance against preventable diseases among the inmates of a house ?

In concluding this report, its author must express his regret at not having had the time to treat in a rigidly methodical manner the various topics which have come under notice. He submits, however, that, while adhering with some closeness to the terms of his instructions, he has made out a case showing the paramount necessity for a methodical and liberal, yet prudent, system of sanitary legislation, and the wisdom of adopting such a code as the Metropolitan Sanitary one, which will be presented to the Convention by one of our Committee. The time, we may hope, is not remote when the writer on sanitary subjects, especially if he desires exactness of detail, and comparisons and results of an authentic kind, set forth numerically, will not be obliged, as he now is, to procure most of his arguments and enforcements of reform from abroad, owing to the deficiency of statistical knowledge and the underrating its value here at home, so that he is deprived of the requisite data either to show with accuracy the extent of existing evils, or

to point out the means for their removal. One measure of the highest importance, and without which nothing trustworthy can be learned of vital statistics, direct or comparative, is a system of births, deaths, and marriages, regularly carried out in every State of the Union.



Appendix E.

D R A F T

OF A

SANITARY CODE FOR CITIES,

(Reported to the Committee on Internal Hygiene)

BY HENRY G. CLARK, M. D., OF BOSTON,

ONE OF THE COMMITTEE.

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DRAFT

OF AN ACT FOR ESTABLISHING GENERAL AND LOCAL BOARDS OF
HEALTH, AND FOR OTHER SANITARY PURPOSES.*

*AN ACT, in addition to existing Acts, for promoting the
Public Health.*

WHEREAS it is expedient that further and more effectual provision should be made for improving the sanitary condition of populous places: Be it therefore enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows; that is to say:

I. This Act may be cited for all purposes as "The Public Health Act, 1860."

II. The Governor of the Commonwealth, with the advice and consent of the Council, shall appoint five discreet and suitable persons, three at least of whom shall be Doctors of Medicine, who, together with the Secretary of State for the time being, and the Governor, *ex officio*, shall together be and constitute a Board, to be called "The General Board of Health;" and shall have and execute all the powers and duties necessary for superintending and promoting the general sanitary affairs of the State.

III. They shall hold their offices for five years, or until others are appointed in their place; and they shall be sworn to the faithful performance of their duty.

IV. They shall meet at such convenient times as they deem expedient, and their necessary official expenses shall be paid out of the treasury of the State, but they shall receive no other compensation for their services.

V. They shall appoint a competent person, who may also be the Register-General, to be the Secretary or Actuary of

* For the debate on this Report, see pp. 86, *et seq.*, and pp. 206, *et seq.*, of the Proceedings.

the Board, who shall receive such a salary, not exceeding dollars per annum, as the Board shall determine. They shall also appoint, if need be, a competent physician, who shall be styled a Medical Health Officer, and another competent person for Surveyor, who shall be removable at their pleasure, and who shall receive such fees or other compensation as the Board may from time to time determine.

They may also appoint and employ such other persons as may be necessary to carry into effect the sanitary laws of the State, and delegate to them the necessary powers, subject to the approval of the local Boards of Health, hereinafter provided for.

VI. They shall consider and decide upon sanitary questions submitted to them by the State, cities, towns, or local Boards of Health.

VII. They shall, by reports or otherwise, diffuse information to the inhabitants of the State on sanitary matters; and shall aid, by regulations, suggestions, and by furnishing blanks, &c., the various local Boards of Health.

VIII. The corporate authorities of the various cities and towns of this Commonwealth are hereby authorized and empowered to establish local Boards of Health, and to enact and enforce, generally and severally, such laws, ordinances, and regulations, as they may deem expedient or necessary for promoting the sanitary condition of the said cities and towns, and as are not inconsistent with the Constitution and laws of the State.

IX. And the said authorities are also authorized to delegate to the said local Boards of Health, or other agents, all the powers necessary for the convenient execution of said laws, ordinances, and regulations.

X. All acts, and parts of acts, incompatible with this act, are hereby repealed.

D R A F T

OF AN ORDINANCE FOR PROMOTING THE HEALTH OF TOWNS.

SANITARY CODE FOR CITIES.

Whereas by an Act of the Legislature in the year 1860, entitled "The Public Health Act," this Corporation has been duly authorized and empowered to make all needful rules and regulations for the preservation of the health of its inhabitants: Be it therefore ordained by the Councils of the Town of——, and by authority thereof, as follows, to wit:

I. This Ordinance shall be cited for all purposes as "The Sanitary Code for Cities."

II. The duty of executing and enforcing the provisions of this "Code," is hereby vested in a Board of Health, at least one-third of the members of which shall be Doctors of Medicine, to be chosen by the Councils, or in such other way as the legal voters may determine; and they are hereby constituted the local Board of Health, with all the powers and privileges usually invested in Boards of Health, and with such further especial powers as may be conferred by the provisions of this Ordinance.

III. And said local Board, or its authorized agents, shall have the right at all times to enter into or upon any premises for the purposes of this Ordinance, and also to call upon any of the officers or of the police, to aid them in the execution of its provisions.

IV. In the construction, and for the purposes of this Ordinance, the following words and expressions shall have the meanings hereinafter assigned to them; that is to say:

The term "person," and words applying to any individual, shall apply to and include corporations, aggregate or sole.

The term "owner," shall mean the person for the time being entitled to the rent of the land or premises in connection with

which the term is used, whether on his own account, or as trustee or agent for any other person.

The expression "improvement commissioners," shall mean the commissioners, trustees, or other persons, intrusted by any local act with powers of cleansing, paving, or otherwise improving any town.

The term "town," shall also include "cities," or any other municipal corporation.

The term "land," shall include messuages, buildings, lands, and hereditaments of every tenure; also rivers, streams, wells, and waters of every description; also easements of any description in respect of the foregoing particulars.

The term "waste-pipe," shall mean the pipe which discharges the waste-water from within any house into the drain.

The term "drain," shall mean any drain of, and used for the drainage of, one building only, or premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cess-pool or other like receptacle for drainage, or with a sewer, into which the drainage of two or more buildings or premises, occupied by different persons, is conveyed.

The term "sewer," shall mean and include sewers and drains of every description, except drains to which the word "drain," interpreted as aforesaid, applies.

The term "slaughter-house," shall mean and include the buildings and places commonly called slaughter-houses and knackers' yards, and any building or place used for slaughtering cattle, horses, or animals of any description.

The term "district," shall mean the entire area, places, or parts of places, comprised within the limits of any district to which this "Code," or any part thereof, shall be applied.

The term "street," shall include a square, circus, crescent, terrace, place, row, mews, alley, court, passage, or other like

place, in which the houses are continuous, or separated only by small intervals of space.

The word "house," shall include schools, factories, and other buildings, in which more than twenty persons are assembled at one time.

SANITARY SURVEY.

V. There shall be made, annually, a thorough sanitary survey of the town or district, as the case may be; and at any other time, when it shall appear from the returns to the Registrar that the number of deaths shall exceed, annually, that of twenty-five to a thousand of the population of such place.

And the Board of Health may, if in their discretion they think fit, direct the Medical Health Officer to cause public inquiry to be made as to the following matters and things, or any of them; that is to say:—

As to the sewerage, drainage, and water-supply;

As to the number and sanitary condition of the inhabitants;

As to the accumulation of filth;

As to any other matter of which the Board may require to be informed.

VI. The said survey shall be made in the manner following, to wit:

The Medical Health Officer shall have the right to call upon the Chief of Police, who shall detail for this service a sufficient number of the regular patrol force, who shall act as inspecting health officers. But during an epidemic season, or when any medical facts are to be obtained, the inspectors shall be Doctors, or Students of Medicine.

Upon receiving his instructions, each officer will commence and diligently prosecute his inquiries; carefully noticing the

state of the streets, lanes, courts, passages, common stairs, houses, rooms, cellars, yards, or vacant lots in his assigned district ; reporting, in detail and in writing, all accumulations of filth ; all cases where the waste-pipes, drains, or water-closets are foul or obstructed ; all cases of prevailing sickness, especially where there is great over-crowding, or unusual destitution ; also all cases of dead bodies found in single living-rooms.

The reports may be made in the manner of the blank forms hereto annexed. (See Appendix A.)

VII. When any nuisance or other source of disease is discovered, notice, in the proper form (see Appendix B), is to be served upon the owners or occupants, forthwith to abate the same, and in case of refusal or neglect for a period of hours, the Medical Health Officer is authorized and directed to cause the same to be abated or removed in the most summary manner ; and he is hereby authorized to call upon the Chief of Police, the Engineer, the Registrar, and the Superintendents of Health, of Streets, and of Drains, to aid him in such removal.

The expense of such removals or abatements of nuisances (of which an accurate account is to be kept), shall be chargeable to the owners or occupants of the premises.

These measures shall be so continuously pursued as to prevent, as far as possible, any re-accumulation of the causes of disease sought to be removed, and each officer shall be held strictly responsible for the sanitary condition of his assigned district.

All persons, acting under and by the authority of this order, may be authorized to enter upon and into any premises which it may be necessary to visit, in compliance with its provisions ; but their object in so doing must be first stated to the occupants, and all unnecessary annoyance to them most carefully avoided.

SEWERAGE.

VIII. The said Board of Health may, if they shall think fit, cause to be prepared, or procure a map, exhibiting a system of sewerage for effectually draining their district for the purpose of this Ordinance, upon a scale to be prescribed by the General Board of Health; and every such map shall be kept at the office of the said Board, and shall, at all reasonable times, be open to the inspection of the tax-payers of the district to which it applies.

IX. All sewers, drains, or waste-pipes, whether at present existing, or which shall be hereafter constructed, shall be entirely under the management and control of the Board of Health.

X. The Board of Health shall cause their district to be effectually drained upon the plan recommended by the General Board of Health of Great Britain; and they shall have power within such district from time to time to do any of the following things:

- (1.) To repair, arch over, enlarge, lessen, or otherwise alter, any existing sewer or drain.
- (2.) To construct any new sewer or drain, with a like power of repairing and altering the same.
- (3.) To discontinue, close up, or destroy any sewer or drain.
- (4.) To carry any sewer, drain, or pipe, for the distribution of sewage, through, across, or under any turnpike or other road, or county bridge, or any street, or place laid out as, or intended for a street, or under any cellar or vault which may be under the pavement or carriage-way of any street or intended street, upon condition of making good all damage done by them; or if it is deemed necessary by the Surveyor of the Board, into, under, or through any lands whatever, upon making due compensation for the same;

Subject, nevertheless, to the restrictions hereinafter mentioned ; that is to say :

- (1.) All waste-pipes, sewers, and drains shall be so constructed and kept as not to create a nuisance, or be injurious to health.
- (2.) If, by the exercise of any of the above powers, any person is deprived of the lawful use of any sewer or drain, the Board shall provide for his use some other sewer or drain equally convenient.

XI. The Board of Health are hereby empowered, upon making due compensation, to do the following things ; that is to say :

- (1.) To construct, either above or under ground, such reservoirs and other works as may be necessary for holding the sewage flowing from the sewers of their district, or to provide outfalls for the same.
- (2.) To cause the sewers to empty into such reservoirs or outfalls, by means of connecting sewers, or such other means as they think fit.
- (3.) To contract with any company or person for the sale of such sewage, or for the distribution of it over any land ; and any such company for these purposes shall have the same privileges, and be subject to the same conditions, as would the local Board.
- (4.) To contract for, purchase, or take on lease any buildings, engines, materials, or apparatus for the purpose of receiving, storing, disinfecting, or distributing any such sewage, and to lease or assign such buildings, engines, materials or apparatus to any company or person with whom the said Board of Health may contract, as aforesaid.

- (5.) To purchase or take on lease any land where such purchase or leasing is necessary for carrying into execution the above objects.

XII. No person shall, without the consent of the Board of Health, do the following things, or any of them :

- (1.) Cause any waste-pipe, sewer, or drain, to communicate with, or be emptied into any sewer of the Board of Health.
- (2.) Cause any vault, arch, or cellar, to be newly built or constructed under any public street ; and if any sewer, drain, vault, arch, or cellar is made, in contravention of this Ordinance, the Board of Health may cause the same to be pulled down, if they shall think fit, and the expenses incurred by them in so doing shall be repaid to them by the offender, and be recoverable from him in a summary manner

XIII. Any owner or occupier of premises adjoining any district, may, with the consent of the Board of Health, cause any sewer or drain from such premises to communicate with any sewer of the Board, upon such conditions as they shall mutually agree.

XIV. Whenever it appears to the Board of Health that any house or other building, already built, is without any waste-pipe, drain, or water-closet, or that they do not empty into such place as is sufficient for effectual drainage, the Board may by notice require the owner of such house or building, with in a reasonable time therein specified, to make a sufficient drain, of a construction approved by the Board of Health, emptying as follows : that is to say, if the sea, or a sewer of the Board of Health, or any sewer which they are entitled to use, is within one hundred feet of the site of such house or dwelling, emptying, as the Board may direct, either into the sea or such sewer ; but if no such means of

drainage are within that distance, then emptying into such covered cess-pool, or other place, not being under any house, and not being within such distance from any house, as the Board of Health directs; and if the person on whom such notice is served, fails to comply with the same, the Board may themselves do the work required, and assess the expenses to the owner or occupant aforesaid.

XV. The following rules shall be observed with regard to drains of houses not already built :

- (1.) The drains of every such new house or building as aforesaid, shall be covered in, and be of such size and materials, at such level, and with such fall, as may be effectual, in the opinion of the Surveyor or Engineer of the Board, to secure a proper drainage of such house or building, and its appurtenances.
- (2.) If the sea, or a sewer of the Board of Health, or a sewer which they are entitled to use, is within one hundred feet of any part of the site of such new house or building, the drains so to be constructed shall communicate with such one of those means of drainage as the Board directs.
- (3.) If no such means of drainage are within that distance, then the last-mentioned drains shall communicate with and be emptied into such covered cess-pool or other place, not being under any house, and not being within such distance from any house, as the Board of Health directs.
- (4.) The Board shall have the power of enforcing and directing the construction of "dry privies," vaults, or cess-pools, wherever the nature of the ground, the building materials in use, the imperfect supply of water, or any other circumstances, shall render this necessary for the

public health, especially for the preservation of the purity of streams, springs, or other sources of fresh water.

But: *a.* These privies or vaults shall be so constructed that their contents can be periodically, conveniently, and safely removed for agricultural or other purposes
b. And they shall be effectually deodorized by some proper and sufficient drying or deodorizing agent, so that they will not be dangerous or offensive, either while undisturbed or during the process of removal.

- (5.) Any house or building which, during the process of repairs, shall be pulled down to the ground floor, shall be subject to the same regulations as if it were a new house or building.

XVI. If any house or building is built or rebuilt, or any drain or vault constructed contrary to the foregoing provisions, the owner of such house or building shall be subject to the following liabilities; that is to say:

- (1.) He shall incur such a penalty for each offense as the Board may determine; or,
- (2.) The Board of Health, after due notice, and his failure to comply therewith, may thereupon proceed to do the work required, and assess the expenses upon said owner.

CLEANSING.

XVII. The following works shall be done in respect to scavenging:

- (1.) All public streets, together with the foot pavements thereof, shall be properly cleansed and watered; all roads shall be properly cleansed, and the whole or any part of such roads may, in the discretion of the Board of Health, be watered.

- (2.) All dust, ashes, and rubbish shall be carried away from the premises of the inhabitants.
- (3.) All privies and cess-pools shall be from time to time emptied and cleansed; but their contents shall first be deodorized. And the Board of Health may themselves undertake, or contract with any person to undertake, the aforesaid works, or any of them.

XVIII. No person, except by direct authority of the Board, shall undertake to remove any of the substances mentioned in the preceding section, or obstruct the Board or its agents in so doing.

XIX. In cases where the Board of Health do not themselves undertake, or contract with any person to undertake, the works heretofore named, they may make by-laws imposing on the occupier of any premises any or all of the duties of cleansing. They may affix reasonable penalties for the breach of said by-laws.

XX. Whenever the Board of Health shall be satisfied that the number of persons occupying any tenement or building is so great as to be the cause of nuisance, or sickness, or a source of filth; or that any tenements or buildings are not furnished with vaults constructed according to the provisions of this Ordinance; or with a sufficient number of privies or water-closets, with underground drains; with proper ash-pits, or with a proper water-supply; or that, from any cause, they are in a condition which is prejudicial or dangerous to the public health, or to the health of the occupants themselves; they may thereupon issue notice, in writing, to such persons, or any of them; that is to say, the owner, agent, or occupant, or either of them, to cause either or all of these deficiencies to be supplied, and the premises put into a cleanly and proper condition, within such reasonable time as they shall appoint: and in case of neglect or refusal to obey such notice, they may themselves cause the alterations and cleansings to be done

forthwith, and the expense of it shall be paid by such owner, agent, occupant, or other person. Or they may, if they think fit, issue notice to the persons inhabiting such tenement, or to the owner or agent, requiring them to remove from and quit the premises, within such time as the Board may deem reasonable; and if the person or persons so notified, or any of them, shall neglect or refuse to remove from said tenement or building, the Board of Health are hereby fully authorized and empowered thereupon forcibly to remove them.

XXI. The Board of Health may make and issue by-laws for the prevention of nuisances arising from filth, dust, ashes, and rubbish, or from the keeping of animals, and may annex reasonable penalties for the breach of said by-laws.

XXII. The business of a blood-boiler, bone-boiler, bone-burner, fell-monger, slaughterer of animals of any description not fit for human food, soap-boiler, tallow-melter, tripe-boiler, or other noxious or offensive business, trade or manufacture, shall not, without the consent of the Board, be established within the district; and the Board may make such regulations in regard to these occupations as they may deem expedient.

XXIII. When the contents of any sewer, or any accumulations of filth, are discharged into any river or stream, in the bed of which the quantity of water is so much diminished, either by drought during the summer, or by any other cause, as to be insufficient to keep the channel clear, the Board of Health may, by excavations or other operations, so deepen the channel as that the flow of water will be accelerated, and the contents of said sewers or drains be thereby prevented from accumulating and stagnating in parts thereof, to the injury of the health, and the annoyance of the surrounding population.

XXIV. No person, without the license of the Board of

Health, shall throw into, or leave in or upon any street, square, or vacant lot, or into any pond or body of water, within the limits of this town or district, any dead animal, dirt, saw-dust, soot, ashes, cinders, shavings, hair, manure, oyster, clam, or lobster shells, waste water, rubbish or filth of any kind, or any refuse, animal or vegetable, whatsoever. Nor shall any person throw into, or leave in or upon any dock, flats, or tide-water, within the jurisdiction of this district, any dead animal or other foul or offensive matter, except as above provided.

XXV. The owners and occupants of livery and other stables, within the limits of the town or district, as the case may be, shall not wash or clean their carriages or horses, or cause them to be washed or cleaned, in the streets, nor otherwise encumber the same; they shall keep their stables and yards clean, and shall not permit more than four cart-loads of manure to accumulate in or near the same, at any one time between the first day of May and the first day of November; nor within that period suffer the same to be removed, except between the hour of twelve at night and two hours after sunrise.

XXVI. Swine shall not be kept within the limits of the town without a permit from the Board of Health.

SLAUGHTER-HOUSES.

XXVII. No place shall be used or occupied as a slaughter-house except by permission of the Board of Health; and they may make by-laws with respect to their management, and for keeping the same in a wholesome state.

THE MARKETS.

XXVII. The Medical Health Officer, or either of the Inspectors or Agents of the Board of Health may, at all reason-

able times, enter into and inspect any shop, building, stall, or place kept or used for the sale of butchers' meat, poultry, or fish, or as a slaughter-house; and to examine any animal, carcass, meat, poultry, game, flesh, or fish, which may be therein; and in case either of them, being intended for the food of man, shall appear to be unfit for such food, the same may be seized; and if it prove to be unwholesome, he shall order the same to be destroyed, or be so disposed of as to prevent its being again exposed for sale.

XXIX. No person shall be permitted to bring into town for sale, or sell, or offer for sale, any fresh fish, until the same shall have been cleansed of their entrails and refuse parts; and such entrails and parts shall be thrown overboard below low-water mark; and shall never be kept beyond the flowing of the next tide; and until so thrown overboard, they shall be kept in a close and safe manner on board the vessels or boats in which the fish are brought. And no person shall sell, or offer for sale, fish of any kind, unless the same be kept in covered stalls, fish boxes, or other houses, which shall always be clean and in good order; or, in clean covered carts, or boxes, well secured from the rays of the sun.

XXX. No person shall have in his possession for sale, or shall sell, or offer for sale, within the limits of the town, any vegetables whatever, excepting green peas in the pod, and green corn in the inner husks, which have not previously been divested of such parts or appendages as are not commonly used for food.

XXXI. No person shall land on any wharf or other place, or shall bring into town any decayed or damaged grains, vegetables, or fruit, without a permit from an officer of the Board of Health, and in such manner as he may direct.

XXXII. No person shall sell any adulterated or unwholesome food or drink; and if, upon being notified by the Board

to discontinue such practice, he shall neglect or refuse to obey such order, he may be ejected from the precincts of the market, and such articles of food or drink may be seized and destroyed.

XXXIII. If any person shall falsify any milk, by adulteration with water or otherwise, or by the abstraction of its cream, or any other substance originally belonging to it; or, if any person having reason to believe it so falsified, shall sell the same, or cause it to be sold, he shall be liable to have it seized and destroyed, and to fine and imprisonment, and to have placards, stating his offense and the sentence imposed, posted up at his place of business or elsewhere, as the Board may determine. This shall also apply to milk from diseased cows.

XXXIV. All bread, except as specially provided to the contrary in this section, shall be sold by weight.

A loaf of bread shall be two pounds in weight; and bread may be baked and sold in whole, half, three-quarter and quarter loaves, but not otherwise, except in bread composed in chief part of rye or maize.

Small rolls and fancy bread, weighing less than one quarter of a pound each, may be baked and sold without regard to weight.

In every shop or place where bread is sold by retail, and in each front window thereof, there shall be conspicuously placed a card, on which shall be legibly printed a list of the different kinds and qualities of loaves sold there, with the price of each per loaf, and half, three-quarter, and quarter loaf.

All bread, except small rolls and fancy bread of less than a quarter of a pound each, sold in any shop or place, shall be weighed in the presence of the buyer, and if found deficient in weight, bread shall be added to make up the weight required by law.

Any person who shall violate any of the provisions of this act, shall forfeit for each offense the sum of dollars, and he shall also be liable to the penalties provided in Section XXXIII.

XXXV. And the Board of Health is also hereby authorized to make, promulgate, and enforce such by-laws for the government of the market-houses and the sale of provisions, as they may think expedient.

DRAM-SHOPS AND DRINKING-HOUSES.

XXXVI. All unlicensed dram-shops and drinking-houses for the sale of intoxicating drinks, are hereby declared to be nuisances, and may be abated, as such, by the Board of Health.

COMMON LODGING-HOUSES.

XXXVII. No person shall keep a common lodging-house without a license from the Board of Health, after inspection by the Medical Health Officer of the Board. And a register shall be kept, in which shall be entered the name of every person applying to register any common lodging-house kept by him, and the situation of every such house; and the said Board shall from time to time make by-laws for fixing the number of lodgers who may be received into each house so registered; for promoting cleanliness and ventilation therein; and with respect to the inspection thereof, and the conditions and restrictions under which such inspection may be made: and the person keeping any such lodging-house shall give access to the same, when required by any person who shall produce the written authority of the Board, for the purpose of inspecting the same, or for introducing or using therein any disinfecting process; and the expenses incurred by the said Board in such process, shall be assessed and collected from the keeper of said house; and if any such keeper of such

lodging-house shall neglect or refuse to obey the directions of the Board of Health, he shall forfeit his license.

CELLARS.

XXXVIII. No cellar or underground room shall be let or occupied separately as a dwelling, without being registered and licensed by the Board, and unless it possesses the following requisites ; that is to say :

- (1.) Unless the same is in every part thereof at least seven feet in height, measured from floor to ceiling thereof ; nor,
- (2.) Unless the same is at least one foot of its height above the surface of the street or ground adjoining, or nearest to the same ; nor,
- (3.) Unless there is outside of, and adjoining such cellar or room, and extending along the entire frontage thereof, and upwards, from six inches below the level of the floor thereof, up to the surface of the said street or ground, an open area of at least three feet wide in every part ; nor
- (4.) Unless the same is well and effectually drained, and secured against the rise of effluvia from any sewer or drain ; nor,
- (5.) Unless there is appurtenant to such cellar or room the use of a water-closet or privy, as the Board may require ; and of an ash-pit, furnished with proper doors and coverings ; nor,
- (6.) Unless the same has a fire-place, with a proper chimney, or other ventilating flue ; nor,
- (7.) Unless the same has an external window of at least nine superficial feet in area, clear of the sash-frame, and made

to open in such manner as is approved by the Surveyor of the Board.

And whosoever lets, occupies, or continues to let, or knowingly suffers to be occupied, any cellar or underground room, contrary to this section, shall be liable to forfeit his license, and shall be subject, if he persists, to such other penalty as the Board may determine: and every cellar, or underground room, in which any person passes the night, shall be deemed to be occupied as a dwelling within the meaning of this Ordinance; but the above rule shall be qualified in respect to areas as follows:

- (1.) In any area adjoining a cellar or underground room, there may be placed steps necessary for access to such cellar or room, if the same are so placed as not to be over or across the said external window.
- (2.) Over or across any such area there may be steps necessary for access to any building above the cellar or room to which such area adjoins, if the same be so placed as not to be over or across any such external window.

NEW STREETS AND HOUSES.

XXXIX. The Board, with the consent of the town councils, and with the advice and aid of the engineer or surveyor, shall fix and determine the following matters; that is to say:

- (1.) With respect to the level and width of new streets, and the provisions for the sewerage and paving thereof.
- (2.) With respect to the structure of walls of new buildings, in reference to stability and the prevention of fires.
- (3.) With respect to the sufficiency of the space in connection with buildings, to secure a free circulation of air, and the ventilation of buildings.

- (4.) With reference to the drainage of buildings, to water-closets, privies, and cess-pools in connection with buildings, and to the closing and prohibition of buildings or parts of buildings unfit for human habitation.

The regulations of this Section, and of Sections XX., XXXVII., and XXXVIII. shall be considered also as particularly applicable, and may be enforced in regard to *Model Houses*, and to houses already built or occupied.

They may annex such penalties, and further provide for the observance of these regulations by such by-laws as they think necessary; and may alter or pull down any work begun or done in contravention of such by-laws: *Provided*, however, that no person shall be deprived by any by-law of such right of appeal as is hereinafter given in respect of by-laws.

SUPPLY OF WATER.

XL. The following provisions shall be observed with respect to the supply of water:

- (1) All public wells, pumps, conduits, or other works used for the gratuitous supply of water to the inhabitants, shall vest in, and be under the control of, a Board of Improvement Commissioners, or such persons as may be chosen for that purpose by the town councils, with the approbation of the Board of Health, who shall have the right to direct the use of the water for any sanitary purpose.
- (2.) A sufficient quantity shall be supplied for domestic purposes, the takers paying such fixed rates therefor as may be determined; and
- (3.) May be supplied to any public baths or wash-houses, or for manufacturing purposes, on such terms and conditions as may be mutually agreed upon.

- (4.) A sufficient quantity shall be provided for flushing sewers and drains, for putting out fires, for cleaning and watering the streets, and for other public purposes.
- (5.) The expense of providing a supply of water for the foregoing purposes, over what shall be paid by the takers, shall be assessed on the inhabitants, or paid in such other way as the councils shall determine.

XL. Any person who willfully wastes or fouls the water, or injures any of the works for its supply, shall be liable to such penalties as the Board or the Commissioners shall determine, and shall be also liable to a suit for damage at common law.

XLII. When it shall appear that any house or tenement let to other persons than the owners thereof is not in any way supplied with water, the owners of such house or tenement shall be notified by the Board of Health to supply the same; and in case of refusal or neglect to do so within a reasonable time, the Board may supply the same at the expense of the owner, or, at its option, vacate the premises.

VENTILATION.

XLIII. No cellar, lodging-house, or other "house," intended for the constant occupation of not less than ten persons, or for the occasional assemblage of large numbers of persons, shall be used or occupied, except under the following conditions; that is to say:

- (1.) Unless the same shall be provided with some effectual ventilation, as follows :
 - a.* By ventiducts for supplying fresh air of a suitable temperature, which shall have a capacity of not less than one hundred square inches for every twenty-five

persons, and in the same proportion for any greater or less number; or,

b. By some other mode capable of supplying pure air to each person at the rate of four cubic feet per minute.

c. By discharging-ventiducts, which open directly into heated flues, or which are conducted into the outer air above the roof, and then terminated by a suitable cowl or cap, and which shall have a capacity of not less than two-thirds of that of the admitting ventiducts; or,

d. By an open fire-place, an Arnott's valve, an opening into some other ventilated apartment; or,

e. By some other effectual method of expelling the foul air.

(2.) Or unless the drains, vaults, and water-closets are securely trapped and effectually ventilated:

a. By connecting them with the rain-water spouts; or, *b.* If within the house, as in the case of water-closets, by a ventilating flue opening above the roof, or which is connected with a heated flue.

PLEASURE-GROUNDS.

XLIV. The Board of Health may, with the approval of the town council, hold, purchase by agreement, take on lease, maintain, lay out, plant, and improve land for the purpose of being laid out as public walks or pleasure-grounds, and support or contribute towards any premises provided for such purposes by any person whomsoever.

EPIDEMIC AND CONTAGIOUS DISEASES.

XLV. When any epidemic, endemic, or contagious disease shall threaten the town, or affect any part of the same, in

order that measures of precaution may be taken with promptitude, according to the exigency of the case, the Board of Health may issue such directions and regulations as they may think fit; and they shall provide for the frequent cleansing of streets and public ways, and for the cleaning, purifying, ventilating, and disinfecting of houses by the owners or agents; for the removal of nuisances; to provide for the sick by establishing and opening temporary hospitals, and for the speedy interment of the dead; and generally for preventing or mitigating such malignant diseases, in such manner as to the said Board seems expedient. . And if any vessel, having any contagious or other malignant disease on board, or having come from ports where such diseases are prevailing, shall arrive at either of the wharves, or come to anchor near them, she shall be ordered by the Health Officer to proceed to Quarantine, there to report herself to the Quarantine Physician.

PUBLIC VACCINATION.

XLVI. In order to prevent the spread of Small-pox, and to diffuse the benefits of vaccination, it is hereby ordained that there shall be provided a suitable apartment for the Medical Officer of the Board, at which place he shall attend at such times as the Board may direct; and he shall vaccinate without charge any inhabitant of this town, not previously vaccinated, who may apply for that purpose. And he shall give certificates of said vaccination, without which no child shall be admitted to the public schools. And he shall also always have on hand, as far as practicable, a sufficient quantity of vaccine lymph to supply the physicians of the public institutions.

INTERMENT OF THE DEAD.

XLVII. The Board of Health, with the consent of the councils, shall, from time to time, provide, in such places as,

having regard to the public health, may appear to them expedient, and within or without the limits of the district, burial-grounds of sufficient extent for the decent interment of the bodies of all persons dying within the district; and it shall be lawful for the said Board, in case it appears to them necessary or expedient so to do, to enlarge any burial-ground provided by them under this Ordinance, and to make any road to such ground, or to enlarge or improve any existing road for facilitating the approach to such burial-ground; and for providing any such burial-ground, or improving it, they may purchase any lands which it may appear to them expedient to purchase for that purpose.

XLVIII. They may inclose and lay out the burial-grounds thus provided, and build therein suitable chapels for the performance of the burial-service, and such other buildings and works as may appear to them fitting and proper.

XLIX. When the said Board shall be of opinion that interment (otherwise than in the burial-grounds provided in this Ordinance) should be discontinued, wholly, or subject to any exception or exceptions, in any part or parts of the town, they shall, after due notice, order their discontinuance; and the grounds so discontinued shall be closed or fenced up in such a manner as to protect the public health, and secure proper respect to the bodies interred therein. And this section shall also be considered as applying to vaults under churches and chapels, as well as to the open burial-grounds.

L. No burial shall take place, or be permitted in any of the so closed grounds, or under, or in any churches or chapels to which this order shall have been applied, except in the cases following; that is to say:

- (1.) In case of long previously existing private rights of sepulture, the Board may, in their discretion, give a

license, under such restrictions as may seem to them proper.

- (2.) Or if, on representations properly made to them, they may deem the permission, if granted in exceptional cases, not prejudicial to the public health.

LI. But any and all persons who may have, by any such discontinuance or closure of any burial-ground, as provided for in section XLIX., been deprived of any rights of sepulture, shall have in the newly consecrated ground the same rights as they respectively would have had in the burial-places thus closed and discontinued; or they shall be otherwise equitably compensated therefor.

LII. The relatives of any deceased person, with the consent of the Registrar, or other person having charge of the closed ground in which the body of the deceased has been interred, and subject to the regulations of the Board, may cause such body to be removed to, and re-interred in any burial-ground provided under this Ordinance.

LIII. The Board from time to time may make regulations as to the depth and formation of the graves and places of interment, the nature of the coffins to be received in the burial-grounds thus provided, the time and mode of removing bodies, and generally, as to all matters connected with the good order of such burial-grounds, and as to the conduct of funeral processions, and the convenient exercise of the rights of interment therein: and such regulations shall be printed and published, and shall be fixed and continued on some conspicuous part of every such burial-ground.

LIV. All burials shall be registered in books to be kept for the purpose, in the manner directed, and by the officer whose duty it shall be made by the Board of Health.

LV. No burial shall take place except upon the written permit of the Registrar or Coroner, who, before issuing said

permit, shall require to be furnished with the name, sex, age, rank, profession or occupation, and the residence at the time of death, of said person ; nor shall such permit be then issued, except the cause of the death of said deceased person shall be fully certified to the Registrar or other permitting officer, by some regularly licensed or competent physician or surgeon.

LVI. The Board may, at any time after the passage of this Ordinance, build, or otherwise provide, in suitable and convenient locations, houses for the reception and care of the bodies of the dead, previously to and until interment, and make arrangements for the reception and care of such bodies therein, and appoint fit officers for such houses of reception ; and they may also appoint or provide medical or other officers, who, in cases where the friends of the deceased so desire, may cause the body of the deceased to be decently removed to one of the houses of reception provided for under this section.

LVII. " Wakes " shall not be permitted, without the special leave, in writing, of the Board, or of its authorized agent ; nor then, if the death has been occasioned by any malignant or epidemic disease ; or if from any cause the health of those who would be there present, or of others with whom they would be in contact, would be thereby endangered.

LVIII. The Board may, from time to time, fix, according to a just and regular scale of charges, the rates in classes, varying according to circumstances, of prices for the conduct of funerals, but so that in respect of the lowest of such classes, the funeral may be conducted with decency and solemnity.

GENERAL PROVISIONS.

LIX. There shall be elected or appointed annually, or at such times as shall be determined by the town councils, for the purposes of this Ordinance, the following officers, who shall

receive such compensation, and perform such specific duties, as shall be from time to time determined; that is to say:

- (1.) A Registrar, who shall be a Doctor of Medicine, whose duty it shall be to record the births, deaths, and marriages, and to regulate all funerals and the proceedings thereunto appurtenant.
- (2.) A Medical Health Officer, who shall be the principal physician-in-ordinary to the Board of Health, who shall superintend, under the direction of the Board of Health, all the sanitary measures ordered by the Board; and who shall advise them generally as to all matters relating to the public health.
- (3.) A Board of Consulting Physicians, who shall be elected annually, and whose duty it shall be, in case of an alarm of any contagious or other dangerous disease occurring in the district, to give the Board of Health all such professional advice and information as they may request, with a view to the prevention of such disease, and at all convenient times, when requested, to aid and assist them with their counsel and advice in all matters that relate to the preservation of the health of the inhabitants.
- (4.) An Engineer, or Surveyor, whose duty it shall be to furnish all plans required for the use of the Board; to advise in relation to the construction and grade of the streets; the structure of the drains; the water supply; and, generally, with regard to all plans for improving the surface and substratum of the district.
- (5.) Superintendents of Streets, of Health (or Cleaning), of Drains, and of Burials; whose duty it shall be to supervise, and direct, and execute the details of the various departments to which they shall be assigned,

under the direction of the Board, of the Health Officer, or of such other persons as the Board of Health may direct.

- (6.) Such other officers as the councils may from time to time determine.

LX. Any person who shall violate the provisions of this Ordinance, or any of them ; or who shall obstruct the Board, or any of its authorized agents, in the performance of their lawful duties ; or who shall do any act or acts by which the public health is endangered, shall be fined therefor not less than dollars, nor more than dollars, for each and every offense, and he shall be subjected to such other penalty as the Board of Health, with the approval of the councils, may fix and determine, and which are not repugnant to the Constitution and laws of the State, or in violation of the regulations of the General Board of Health.

LXI. If any person feels aggrieved by any order of the Board of Health, or by the orders or acts of any of its accredited officers or agents, he shall always have the right of appeal to the Board of Health ; or, if he so elects, he may prosecute such appeal in the courts of law, in accordance with the Bill of Rights, as in such cases made and provided : but no such appeal shall be entertained by the Board of Health, unless said appeal is made within four months next after making such order, or the doing of such act, nor unless ten days' notice in writing is given to the party against whom the appeal is brought, stating the nature and grounds thereof ; nor then, unless the appellant enter into sureties duly to abide the decision of the Board, or to prosecute his appeal in the proper court.

LXII. All Ordinances and parts of Ordinances heretofore passed, inconsistent with this Ordinance, are hereby repealed.

APPENDIX A.

FORM OF RETURN.

The Health Officer, or Inspector, after ascertaining the condition of his district, shall make his report in the following manner, viz. :

"Health Officer, A. B. , District , reports the condition of premises No. , street, to be as follows:

1. PREVALENT SICKNESS.

(Under this head state what the disease is, and how many are affected.)

2. OVERCROWDING.

(State in figures the number of persons occupying the rooms or houses in *badly situated localities*.)

3. VENTILATION.

(State if there is any; and, if so, whether it is by doors, windows, or fire-places; especially *when the apartments are closed at night*.)

4. DRAINAGE.

(State simply if there is *any*, and whether it is "good" or "bad.")

5. FILTH AND RUBBISH.

(State the kind, quantity (by estimate), and its specific locality.)

6. WATER SUPPLY.

(State if there is a supply of water for *cooking, washing, or bathing*, and of *what kind*.)

7. DEAD BODIES IN SINGLE LIVING-ROOMS.

(State the cause of death, and the general condition of the apartment and its inhabitants.)

He shall also make a record, in a book to be furnished him for that purpose, of the same facts in tabular form.

APPENDIX B.

FORM OF NOTICE TO ABATE NUISANCES.

(To be served by any Officer competent to serve a civil process.)

CITY OF
OFFICE OF BOARD OF HEALTH, 18

To

No.

St.

SIR—Your premises having been examined and ascertained to be in a condition which is in my opinion prejudicial to the public health, by reason of
you are hereby required, in conformity with the provisions of an Order of the Board of Health, passed to
within hours.

Health Officer.

Approved.

Chairman Committee of Board of Health.

EXTRACT FROM THE ORDER.

"*Ordered*, That the Medical Health Officer, with the concurrence of the Committee of the Board, be and he is hereby authorized to take such measures in regard to causes or occasions of danger to the public health of the city, as he may deem necessary and proper for its preservation."

PROCEEDINGS

AT THE

BANQUET

GIVEN BY THE

COMMON COUNCIL OF NEW YORK

TO THE

National Quarantine and Sanitary Convention,

AT THE

METROPOLITAN HOTEL, APRIL 29, 1859.



NEW YORK:

EDMUND JONES & CO., PRINTERS TO BOARD OF COUNCILMEN,

No. 26 JOHN STREET.

1859.

PROCEEDINGS.

THE New York Common Council entertained the delegates to the Quarantine and Sanitary Convention by a banquet at the Metropolitan Hotel, on Friday evening, April 29th, 1859.

Although the time to make the preliminary arrangements for the entertainment was necessarily brief, the manner in which it was prepared reflected great credit upon the Special Committee of both branches of the Common Council, of which Alderman F. I. A. Boole and Councilman F. J. Ottarson were Chairmen, and furnished an additional proof of the well-earned reputation which the Metropolitan has long enjoyed. The superintendence and immediate arrangement of the festival were most satisfactorily executed by Councilman Ottarson.

The hall in which the guests assembled was decorated with the national flags and other appropriate emblems; and Dods-worth's celebrated Band discoursed choice music during the evening. The company sat down at 7 o'clock, Mayor TIE-MANN presiding, and the Mayors of Boston, Providence, Newark, Jersey City, and Richmond, occupying seats on either side, supported by many of the distinguished physicians attending the Convention.

After the cloth was removed, the Mayor announced

THE FIRST REGULAR TOAST—" *The Great Public Questions involved in the assembling of a Sanitary Convention: the Health, Morals, Happiness, and Lives of the People.*"

HIS HONOR said that the Common Council of the City of New York had called them together on that occasion, to show

their appreciation of the labors performed by the Medical Faculty of the United States, and also to show the efforts now being made by the Quarantine and Sanitary Convention, for the purpose of benefiting commerce, ameliorating the sufferings of sailors, and protecting the health of the citizens of the whole Union, as well as the inhabitants of the world. He (the Mayor) would not inflict upon them a long speech, for it was pretty well known that he was more of a working than a talking man. He called upon Dr. Griscom, the President of the Convention, to respond to the toast which he had announced; to which Dr. Griscom replied as follows:

Mr. President—When I first saw the announcement of my name at the head of this list, I deemed it almost impossible that it could have been placed there except by mistake; for like yourself, it is well known that I do not aspire to be a talking man. . . have done some little work in my day, but generally I have done it silently; yet upon second reflection, I begin to feel that I am in my proper place at the head of the list; for as a dark body, behind which there shall be a blaze of light, becomes invisible, so I shall be soon forgotten in the bursts of eloquence which are to follow. I am fortunately situated in other respects. On each side I find myself supported by a venerable Knickerbocker, whose silvery locks flowing over their shoulders, remind us that they could give us some reminiscences of the sanitary condition of New York in the early days of its history, and who could give us some of their experience of the condition of our beloved city at that time

Each of these honorable men has performed the wise act of erecting his own monument, by which they will be remembered—the one, the dignified Clerk of the Common Council (David Valentine), as long as his “Manual” history of New York City shall endure; the other (Peter Cooper), as long as “shines a good deed in a naughty world.”

Mr. Mayor, the sentiment to which I am asked to respond, embraces a vast field of inquiry and observation—the *health*, the *morals*, the *happiness*, and the very *lives* of the people. These are the matters, gentlemen of the Sanitary Convention, that belong to us to consider and effect by our labors. What connection is there, do you ask, between sanitary labors and the morals of the people? Let me answer in the words of a distinguished sanitarian, that to a certain extent “the causes of fever and the causes of crime are identical;” they are the same, and wherever we find a general bad state of health, there we shall find wretchedness and bad morals. And let me tell you, Mr. Mayor, and you, venerable gentlemen who sit around this Board, now representing, officially, some half-dozen of the largest cities of this Union, that if you wish to improve the *morals* of those over whom you are called to administer the laws, the first step to be taken is to improve their health.

Mr. Mayor, I am cautioned to be brief. Let me advert, however, to one of the resolutions of the “Quarantine and Sanitary Convention” passed this day almost unanimously; a resolution which I predict will strike the country with astonishment when it is heard to-morrow morning, spread abroad over the land on the wings of the Press. If you should ever happen to go to Havana, and come thence in a ship stricken with Yellow Fever, and you should have the pleasure of visiting, on the passage, the beautiful city of Providence, over which presides the gentleman second upon your left (Mayor Rodman), he, as President of the Board of Health, will be authorized by that action to confer upon you the pleasure of being released from Quarantine immediately; and so far we are able to say that we contribute to the *happiness* of the people.

In coming here this evening, I happened accidentally to be in the same vehicle with our venerable friend on my right

(Peter Cooper, Esq.), who has so great a fund of statistics at his command, and he told me that he had resided in New York from his boyhood, when it had but 50,000 inhabitants, to the present time, with its 750,000. I would ask my venerable friend what would have been the sanitary condition of New York at this time, if the Sanitary Association of New York had been in existence when he was a young man, and had continued until now? Would it have been one of the most unhealthy cities of this Union? He cannot answer otherwise than in the negative.

I have just learned another important fact, showing the contrast between our own city and another, related to me by my friend, Professor G. B. Wood, who also sits upon my right. At the last census the city of New York presented 100,000 more population than Philadelphia, and yet in Philadelphia there are 30,000 more buildings. That is a most pregnant fact, and what is the result? In Philadelphia the statistics present one death annually in every fifty of the population, while the statistics of New York show one death in twenty-seven.

Mr. President, I shall detain you no longer with these dry figures. I only desire to present these great facts in this striking manner, that every one may see and know that the creation of Sanitary Associations is not an idle or a futile labor, but that there is room for work. We must all work, laymen and professional men together, and they who are at the head of civil affairs must take the leading hand. But I must keep you no longer from the enjoyment of the brilliant intellectual feast which is to follow, and therefore resume my seat.

THE SECOND REGULAR TOAST—"The States of the Union represented in the Convention: Honor to those engaged in so laudable a cause."

The Mayor called upon his Honor Mayor Mayo, of Richmond, Va., to respond.

Mayor MAYO, on rising to address the company, was received with loud applause. He said :

Gentlemen, from all parts of this extended Confederacy, my worthy and honorable friend on my right (Mayor Tiemann), has really forgotten his position here to-night ; and instead of carrying out the dignity of official civility, he has, if he will pardon me, played the part of Chief of Police. I hoped I had been forgotten, and really I began to congratulate myself. I felt a good deal like an escaped criminal when I saw that my name was not noted on the list of toasts—I thought I had escaped the vigilance of the Mayor's police (alluding to the Committee of Arrangements), and that I occupied the happy position of being unknown and forgotten by all. But, vigilant as he is upon all occasions, at the festive board or at the head of this great metropolis, he has arrested me as a sort of innocent culprit, and brought me before this audience to do that which I am utterly incapable of doing. He says, gentlemen, that he is not a speaking but a working man ; and how can I, that never had, certainly for the last forty years of my life, a pestle or a lancet in my hand, be expected to address such a body as this ? I cannot be an acting man upon any subject connected with Medicine. I cannot be an acting man upon any of the subjects that are before this Convention, unless it is to say, as I take pleasure to say on all occasions, from the bottom of my heart, that it gives me gratification and patriotic pleasure to see the people of the United States assembled to transact any business honorable to themselves in any part of this republic. Although, as I have intimated, I am not a member of the medical faculty, but belonged at one period of my life to a profession requiring more of memory and conscience, namely, the law ; still I am delighted to see you here to-night, and to have the opportunity of bearing testimony in this assemblage of medical gentlemen, to the correctness of your

action to-day. The vote taken at your morning session, which was almost unanimous, is, in my opinion, a correct and scientific judgment upon the subject of Quarantine laws. It is my good fortune to live in the metropolis of Virginia, and to have borne, in common with the people of the United States, that great calamity which visited our sister city of Norfolk. I know, from the position I occupied there (and it is a fact that I will now put before this meeting of medical gentlemen), that every individual who came there from that unhappy borough at that time, with the Yellow Fever upon them—and I believe the number was forty—died; but there was not a solitary instance in which the Yellow Fever was communicated to any human being in the city of *Richmond*, although some of the patients were kept in private houses, and were brought in contact with our citizens. Although healthy persons were around the sick daily and hourly, from the time they arrived until they were buried, there was not one single human being affected in the slightest degree with the disease. I have come to the conclusion, without any science upon the subject—for I am a matter-of-fact man—that Yellow Fever is not a contagious disease. The gentleman who has preceded me (Dr. Griscom), has uttered a great truth. When gentlemen talk about crime and the effects of the want of medical attention upon human beings to produce crime, I can understand it, for in one sense I have been dealing with it all my life. I tell you, gentlemen, that there is nothing that contributes more to curing disease, and improving the morals, than the medical profession; for crime and disease are linked hand in hand; and that community that is healthy, industrious, and laborious, is the freest of all from crime. Allow me to add, that you might have gone further than that in this sentiment, and have said, “that the community that is healthy, industrious, and the furthest removed from crime, are the happiest

people upon God's earth. I know very well that it is useless for a man who has no medical skill or knowledge, to occupy the time of this assemblage of scientific and professional gentlemen. I have received so much attention and kindness from the Chief Magistrate of this city, that I cannot withhold the expression of my thanks to him, at this time, although it may be considered out of place. I believe there is no man in this or any other community that knows better how to dispense the hospitalities and services of any city than the honorable gentleman sitting here. I ask the guests and all the gentlemen present to unite with mein a full bumper, in drinking the health of DANIEL F. TIEMANN, the Mayor of New York

The toast was drunk with great enthusiasm.

Mayor Tieman briefly replied, thanking the company for the manner in which they drank his health, assuring the Convention that they were welcome to the city of New York, and to their festive board, and that the city authorities would be always glad to see them.

THE THIRD REGULAR TOAST.—*"The Municipal Authorities of the City of New York: always desirous to extend their hospitalities to sister cities."*

Responded to by Alderman McSpedon, President of the Board of Aldermen. He said that he found himself in the same position as their distinguished guests, Dr. Griscom and the Mayor of Richmond. He (Alderman McSpedon) was instructed, on behalf of his associates, to tender to the gentlemen of the Convention a hearty welcome and such hospitalities as the circumstances on this occasion permitted, and was happy to perceive that their efforts were duly appreciated by the Convention. The Common Council were very much surprised and disappointed that the Convention

had determined to adjourn at so early a day, and that the municipal authorities were deprived the gratification of showing the gentlemen of the Convention the various charitable institutions in this city, of which the authorities had such a just cause to be proud. Had the members of the Convention determined to protract their stay, he (the speaker) assured them that the hospitalities of this city would not have been confined to the municipal authorities, but in every public institution, the same hospitalities and the same welcome, would have been tendered to them that a portion of the Convention, he was happy to learn, had received that afternoon, while visiting the institutions on the Islands. In conclusion he thanked the Convention for the manner in which they were executing the great work in which they were engaged, hoping that they would effect some reform in Quarantine and sanitary affairs, and trusting that at some future period the authorities of the city of New York would have the opportunity of extending her hospitalities to them.

The President called upon General PROSPER M. WETMORE to propose the fourth regular toast, and that gentleman responded as follows :

Mr. President and Gentlemen—The only hope that I have of being able to make my voice audible in this large assemblage, rests upon my friend, the Ex-Councilman, Mr. Haswell. If he will put into operation the proper sanitary regulations in his department at the lower end of the table, there is a possible chance that I may be heard.

You will perceive, gentlemen, that there has been a change introduced into the programme, and I feel it to be my duty to return my cordial acknowledgments to his Honor the Mayor, for giving me the opportunity, and the privilege, to be heard in this presence, and upon the subject embraced in the toast I am to offer.

It might seem strange in such a company as this, that a non-medical man should be selected to speak to a toast in honor of medical science. Sir, I deem it proper, eminently so, that a non-medical man should be heard upon this subject, and, with your permission, I will proceed to give you my reasons for this opinion. Something more is due to the medical profession than it has been usual to accord to it on occasions like this—something more than a member of that profession could, consistently with a due regard to delicacy, render to his peers. I am at liberty to speak the simple truth on this subject, and I do not hesitate to say, that I regard it as a profession to which the cause of humanity owes more than it does to any other in which the human intellect is employed. No one can deny the truth of my statement, that medical men receive from their fellow-men less of praise, less of reward, less of the applause which usually attends the successful performance of onerous duties, than is given to the like amount of intellect and labor employed in any other profession.

Who, let me ask, is the faithful friend of him who is stricken down wounded from the ranks of those who fight the battles of their country? Who is more devoted to the duties of his station than is the surgeon of his regiment? And yet, who ever hears, when the hour of triumph comes—when the flag of victory floats over the hard-won field—when the honors and rewards are to be distributed—of the surgeon whose arms were buried to the shoulders in the red tide of the bloody field?

Who is there more devoted or more faithful on the slippery deck, or in the sick-ward of the line-of-battle ship, when carnage rages or the pestilence invades, than is the undecorated yet ever-watchful surgeon? Who win and wear the rewards of promotion and fame, save the officers who glitter in the epaulettes and the lace, while the surgeon, unadorned, and undistinguished, goes to the privacy of life his

deeds unsung, and his name unmentioned, in the glowing passages of the official dispatch?

In other branches of the profession—in social life—in our domestic homes—in institutions of charity and benevolence—wherever science is required to present itself in the person of a medical practitioner—who has ever found him recreant to his self-sacrificing duty? No! He will ever be found the right man in the right place, and at the right time. But where does he meet the grateful recognition of his merit from the voice of public sentiment? He has an enduring reward, however, which lives within his breast, springing from the consciousness of duty performed, and in the sad or happy memories of a few fond hearts, whose tears or smiles are the grateful recompense that must content his anxious thoughts.

Let us call to mind the condition of great communities when the fearful pestilence stalks, in darkness and silence, into their midst, knocking with spectral hands at every man's door. To whom in such dreadful emergencies, next to their prayers to a gracious Protector, are the eyes of the sick and the well hopefully turned, and when has it ever been known that the appealing look has been in vain? Sir, if my memory fails me not, more than thirty medical practitioners, many of them eminent in their profession, surrounded by all the ties that make life valuable, voluntarily, without hope of emolument in the discharge of a solemn duty, surrendered their lives in the contest with a pestilential disease in a neighboring city only three years since; and yet who in this large company, save some sympathizing friend from Virginia, can recall the names of those noble-minded martyrs to science? Sir, I take shame to myself that I cannot recall the name of one, even, of that disinterested, self-sacrificing band.

When I took my seat in the Convention, whose labors are continued so agreeably to-night, the first object that attracted my attention was a simple mural tablet in the college hall;

upon which were inscribed some twenty names. I inquired the purpose for which it was thus placed, and whose were the names. The answer was significant of the thoughts I have here attempted to express. These were the names of a score of young men, recently graduated from the medical colleges of our city, who, in their youth, filled with high hopes, with many anxious hearts watching for their welfare, in the day of pestilence gave up their young lives to the cause of medical science. Give me leave to ask, who, besides medical men and bereaved relatives, know this sad history? Yet there is a living page on which it is written, and where it will remain.

In one of the public squares of the beautiful city of Baltimore, there is erected a noble monument, which is the pride of that enlightened community. Upon its base are inscribed the names of every citizen soldier, without regard to rank, who fell in defending the soil of Maryland from an invading foe. Every traveler pays the homage of his respect to the city that thus perpetuates the memory of the heroic dead.

In the open grounds attached to one of our cathedral churches, beneath the shade of ancient trees, a monumental structure, with captured cannon planted at its sides, attracts the attention of the observer. If he explores the words engraved on the stone, he will find the names of the youthful heroes who won their immortality by the side of Lawrence, when they fell together in death, on the shattered deck of the Chesapeake.

All this is well, nobly done, to place the record of deeds of heroism and honor before the popular eye; to keep alive the memory of departed worth, and to stimulate the coming generations to follow in the path of patriotism and duty. But I am unable to call to mind any similar testimonial consecrated to the memory of medical men struck down in the path of duty, save only the simple tablet on the College wall, which tells, in the language of fraternal affection, the story of professional pride, and duty unto death.

When I undertook to discharge a duty which could have been so much better performed by numbers within the sound of my voice, I was proud of the opportunity for attempting, even in this feeble manner, to render justice to a profession which I admire and honor. Sir, there is pregnant meaning in that one word, "Science," which is introduced into the toast I hold in my hand; pregnant with great thoughts. I would that I had the intellect to conceive the thoughts and the words in which to give them utterance, that I might stir your hearts, as many a man upon this floor could stir them, were this subject properly discussed before you.

Science! why, we live in an atmosphere of science. It is the age of Science. Whenever the history of the literature and the arts of the nineteenth century shall come to be written, it will be referred to in all after-time as the age of Science. In every thing that makes up the philosophy of every-day life, Science predominates; in our food, in our clothing, in the air we are permitted to breathe pure, within these confined walls; Science, under the Providence that governs all things for good, has ministered to our necessities, our comforts, and our happiness.

When these words to which we are now giving utterance, shall float on the wings of the press, Science will be distributing them to the ends of the earth. Is there one person present in this assemblage, who, when he leaves his home for business or pleasure, is content to travel in any other mode than that which shall enable him to count his miles by the turning of the minute-glass? What gives him the power of this velocity of motion save the inventive genius of Science? Is there one present engaged in discussing abstruse principles, communicating important facts, disclosing startling events, or conducting business of any nature, with correspondents at a distance, who is satisfied to do so in any other way than by flashing his thoughts on the wings of the lightning? Is not that one of

the great, marvelous wonder-workings of science? Does not science bring its agencies to bear also upon the operations of the human intellect? Do we not condense our thoughts with a fervor of expression, into single words and brief phrases that mingle with the energies of the magnetic power? Is not Science, therefore, stamping its wonders upon our physical and intellectual organization, and bringing the human mind into subjection to its laws? Science! It is the word of the time and the age.

"Sanitary Science." Those two words should arrest every mind and stir every heart within the influence of the voice that utters them. In all that relates to Sanitary Science in this country, we are behind the age. I ought to qualify that expression, and confine the remark more nearly at home. But I ask my friends from other cities to bear with me, and to share in some degree the blame which attaches to our national neglect of sanitary rules. We are at least in this, the Metropolitan City, far behind the age, in comprehending and executing the principles of this great moral theory.

Look at the noble government of England, and marvel at what it is doing to promote health and to preserve life. Compare the statistics of mortality in London with those of our own city, and then judge of what can be accomplished by an intelligent, energetic government, and a rigid adherence to the laws of Sanitary Science.

Sir, do you know—do the non-medical gentleman about these tables know (the medical men do know, you may be sure), that the great man of England to day is not a military chieftain, not a leader in Parliament, not a learned lawyer, but is a leader in the great work of Sanitary Reform. Chadwick is the great leading spirit of England to-day. As he traverses the Kingdom preaching the crusade against disease and death, and uplifting the banner of Sanitary science, he is greater in reality, because more true to the principles of humanity,

than ever was Wellington in the days of his military power, or Canning, when, in the plenitude of his glory, his brilliant eloquence thrilled the hearts and held captive the feelings of multitudes of men.

Gentlemen, I thank you for bearing with me so patiently, and I will detain you but a moment longer. In speaking to the toast that has been confided to me through the courtesy and kindness of the Chairman, it is but right that I should allude to the medical profession represented with us to-night, and I ask you to bear witness with me to the merits of those who are actively engaged, in our midst, in this work of humanity and mercy

And first, let me mention the name of Francis, the venerable, the respected, and the good, John W. Francis, a name that, for fifty years, has been a household word amongst us here in New York, and the mention of which always awakens pleasing and grateful recollections of the olden time.

There is another much respected name, honored in our Revolutionary annals, and which now gives strength and influence to our councils, in the person of him who sits an honored guest by your side. You will know, sir, that I can only allude to Dr. Alexander H. Stevens, whom all sanitarians are proud to recognize as an ardent advocate of the doctrines they support.

Joseph M. Smith, who welcomed the Convention so kindly and gracefully to the halls of the Academy, is also a shining light in the ranks of sanitary reform.

John H. Griscom, bearing a name always dear to the lovers of science, has devoted almost a lifetime to the same noble object; Griscom, who bears our banner now, and whom we follow with the confidence and hope that always attaches to an able and faithful leader; Batchelder, who has long worn the honors of the profession, as President of the Academy of Medicine, an earnest friend of the cause; Harris,

learned, intelligent, and thoroughly skilled in the science of Quarantine, and the relative duties of internal hygiene, than whom none can be named more worthy of our regard; Watson, the President of the Academy, the enlightened representative of the profession, who adds strength and dignity to our organization; McNulty, known to all of you as active, energetic, and persevering in whatever he undertakes, and one who never turns back from the path on which he has entered—these are but the types of a profession whose members, with scarcely an exception, are engaged with warm hearts in this work of mercy and philanthropy. I would that stronger words than mine could render them a fitting tribute of praise.

Mr. President and gentlemen, I have done. It was my duty to speak of the subject which has detained you so long. The cause is gaining strength every day, and I hope yet to find my highly respected friends of the City Government, whose guests we are to-night, more earnest than they have been hitherto in the good work, because better advised in regard to its importance than perhaps they have been in past times. I believe I have put that point as delicately as I know how. But it is nevertheless true, that I do hope to find a better feeling in high places towards the work in which we are engaged; and I have a strong confidence that I shall yet be called upon to assist at the triumph of sound sanitary principles, with Alderman Boole by my side.

I have now to ask this company to join in drinking

THE FOURTH REGULAR TOAST: *Medical Science—Instinct with Humanity, its Mission is Divine; it claims not the prerogative to give Life, but it may arrest the march of Death.*

Dr. Alexander H. Stevens, the senior member of the profession present, was called on for a response.

Dr. A. H. STEVENS:

Mr. Mayor and Gentlemen—I am indeed surprised that the duty that has been imposed upon me unexpectedly, and at but a moment's notice, should have been intrusted to one who is so incapable of performing it. I appeal to your indulgence when I remind you that I have been more brought up to the *stet-d-ettes* of the sick-room and the whisperings of the cradle, than to addressing a popular assemblage like the present. Were you entirely a collection of medical gentlemen, I should know how to receive beforehand the indulgence which my short-comings may require. I desire it more particularly from those who do not belong to my profession. Gentlemen, I thank you for your profound silence; it is the most flattering boon I could receive from you, and it encourages me to proceed. I shall detain you but a very few moments. The burden of the toast is, "Medical Science." The gentleman on my right informs me that the two distinguished bodies, to whom we owe the hospitalities of this occasion, are, for the most part, mechanics. I am a mechanic, too. Surgery is the first of the mechanic arts. And, gentlemen, while you profess to have received so many benefits from Science, which is undoubtedly true, we come forward and acknowledge to have received benefits from your hands, from your mechanism, from your contrivance, and from your instruments, without which the march of Science would have been long since arrested. *Galileo* could not have made his discoveries in the heavens without the aid of Art. What could have been done with the microscope and telescope, and all the contrivances by which life is made comfortable, and by which luxuries are afforded us at a cheap rate, without the co-operation of Art? Science and Art go hand in hand: they stand together on that noble monument which Mr. Cooper has erected. "Science and Art" are the words. Separated they must not be, separated they cannot be.

Gentlemen, we thank you from the bottom of our hearts that you have brought us together in personal contact with each other, as we are in union in reality. It is by the interchange of friendly sentiments and good feeling, that the interests of society are promoted. Let us understand each other, and there will be no misunderstanding afterwards. The difficulty is, that we are kept asunder; and being kept asunder, misunderstandings arise. Invite some of us to exchange sentiments with you, and you will find us devoted to your interest, as we know you are devoted to the promotion of ours.

THE FIFTH TOAST—" *The City of Philadelphia: First in the cause of sanitary reform—in other days, she was the first to declare the birth of an independent nation—*

Was allotted to Washington L. Bladen, Esq., who said, that when he considered the number of able gentleman who were present from Philadelphia, and remembered his youth and inexperience, he hoped he would be excused from responding to the sentiment, and that they would allow the mantle, which had fallen upon him, to be transferred to Professor Wood of Philadelphia.

PROFESSOR WOOD was very warmly received on rising to address the assemblage. He spoke as follows: I need not tell you, gentlemen, that the call you have made, is wholly unexpected by me. I came to New York on a visit disconnected with the purpose for which the gentlemen present generally came. I accidentally stepped into their meeting, and had the honor of being invited to a seat as one of the delegates. I came, therefore, altogether unprepared in relation to the subject which has engaged the attention of the gentlemen attending this Convention. Besides, I am not accustomed to this kind of public speaking. I can speak when I have a subject before me. Most of the gentlemen present know

that I am in the habit of didactic instruction. I can lecture, but I cannot deliver an extemporaneous address—at any rate, I cannot speak when I have nothing to say. On the present occasion I have very little to say. There is one thing, however, I have to say, and that is, to express the thanks of the representatives from Philadelphia here to the gentlemen of New York who have given them so handsome an entertainment on the present occasion, and have generally extended to them such cordial hospitality. I would also observe that Philadelphia and New York, though somewhat rivals—we are willing to be considered second to New York, only following close upon her heels in almost every point—in commerce, in wealth, and in various other points; and I shall be willing to acknowledge that we are second in sanitary considerations, when I am able to do so.

SIXTH TOAST.—Baltimore: The youthful giant of the South, as ready to follow in the lead of Science, as to take her place in the ranks of enterprising and prosperous cities.

Dr. KEMP responded as follows:

Mr. President and gentlemen: I regret exceedingly that Baltimore has not had one more able than I am to speak on this occasion in her name. I am not accustomed to raise my voice in public: I am in the habit, sirs, of speaking in low tones—and those, tones of consolation and of comfort to the afflicted and to the distressed. It is my duty to console and comfort those who are mourning, and to mingle with the grief and the sorrows of those with whom I am associated in daily intercourse. I am not prepared to speak before such an assemblage as this; and yet, sir, when I have been called upon, I feel that I should be recreant to my duty if I failed to do at least what I can do, which you will find is but very little.

The gentlemen who have prepared this toast, have been pleased to call Baltimore the Youthful Giant. Sir, it is but

a hundred years since Baltimore was in its infancy. In 1756, I think there was something like fourteen houses where that city now stands. It commenced with feeble origin: for one good gentleman who owned a piece of land that had a little iron ore upon it, when people talked about locating Baltimore town somewhere in that neighborhood, he posted with all his might to the seat of government, and begged the representatives of the people not to locate Baltimore there, for by so doing they would ruin his land. Providence, sir, seemed to direct things for her good, even in that early period of her history; for of all places, that would have been the very worst place to have located Baltimore upon. The gentleman saved his land, and got a few tons of iron ore from it, and it is there yet. Yes, sir, the city from which I come has grown. I was utterly amazed in looking over the Quarantine laws of Baltimore, to find away back in 1700, just a while before the Revolutionary War, that Baltimore town originally occupied only a very few acres of land. There was a stream running just to the east of that city, and a gentleman who lived on the other side of the creek had a little farm, and laid out a garden. He became very ambitious, and was tired of living in the country, and petitioned the Colonial Legislature to incorporate his house and his garden in Baltimore town, so that he could live in town; and it is an absolute fact, that among the laws of Maryland is one law incorporating this small piece of land where Fell lived, making it a part of Baltimore town. Baltimore has grown by the addition of a few acres at a time in its early history. I was surprised to find that fifteen, twenty, and thirty acres were the successive additions made to our city. But there were causes that sprung up to make Baltimore advance with gigantic strides. The spirit that animated the early settlers of Baltimore inspired them to embark very early in commerce. That spirit animated them upon other occasions, and awakened all their energies, and made them exert them-

selves for the benefit, not only of Baltimore, but of this entire Union. Sir, there is such a thing known in the history of the Revolution—that time which tried men's souls—when at your own Saratoga the armies of the American people were victorious, when the conflict was yet to go on in the South, that Maryland, and Baltimore as a part of Maryland, was found represented in your Revolutionary army; and there is a name distinctive of a particular line in that army that tells a good story for Baltimore in that day of our infancy. Sir, I love to hear of Maryland in connection with subjects of this kind; and, although my recollection cannot go back to the days of the old Maryland line, yet I have lived at a time early enough to see a few of the venerable patriots before they left this land of liberty for the acquirement of which they had shed their blood, and I bless the day that I did see them. Baltimore, sir, has been designated the youthful giant; and she is strong in many respects; and the circumstances that attend the action of this Convention, and the resolution that is passed to-day—a resolution full of import for good—only brings out in bold relief the fact, that Baltimore has almost always been strong in the lead in support of the proposition, that Yellow Fever was not communicable from person to person. The name of Potter is familiar to many of the gentlemen who are here, although many of the medical men may never have seen his venerable head, gray with the toil of years in science. Potter was one of those, who long ago assumed a forward position in declaring that Yellow Fever was not contagious. And too, our people are strong. In 1855, when the Yellow Fever prevailed in Norfolk, when the whole country was trembling with apprehension under that promulgated doctrine that the Yellow Fever was advancing to the north, Baltimore was the first city north of Norfolk to catch the infection and to be visited with that dire pestilence. Everywhere consternation prevailed. The whole Union looked with alarm and

apprehension at Norfolk, and shrunk back almost instinctively from the idea of communication, however remote, with that ill-fated place. It was, then, sir, that the citizens of Baltimore were strong. Standing in close proximity to that ill-fated city, our inhabitants trembled not, but with a firm trust remained within their own locality, and rendered their assistance to the health officer, in keeping open port to which the poor victims of the dreadful pestilence might flee, and thus escape a fearful death, which would have been the result of keeping them pent up in their own infected city. When a community is strong, then the officers to whom may be intrusted the high interests of the people will also become nerved, and strong in their purposes, and good will result from this determined support which you give to your public authorities. Sir, I cannot detain you longer. I have only in the name of Maryland and in the name of Baltimore, to thank you, gentlemen of the city of New York, thank you with all my heart for the kindness and the hospitality that you have been pleased to extend to us. And I only wish to say, that upon any occasion we shall be most happy to try and do something that will approach at least this liberal manifestation of your kindness.

SEVENTH REGULAR TOAST.—*Boston : The Cradle of Liberty ; in the older times, a pattern to her sisters ; now in the perfect system of her government.*

Mayor LINCOLN responded as follows :

MR. MAYOR—I know every member of the medical faculty will agree with me in the assertion, that one of the great merits of a patient is, that he should obey the command of his professional adviser. In that respect, sir, I am somewhat in quarantine to-night. Unfortunately I have been in the hands of some of our good friends of the medical profession, for the first time for many years. I have been confined to my house.

I had just got out, could walk about the streets, go down to my office, and attend part of the day to my professional duties, when the gentlemen of the Board of Aldermen asked me if I would not go with them to New York. I asked my good friend Dr. Ware. He said: "Yes, you may go if you will not feast, or will not speak." So that you see I am somewhat in quarantine to-night; and I put it to the members of the medical profession here, under those circumstances, Ought I to utter a single word? (No, no.) But, sir, as I am upon the floor, I must say a word in response to the sentiment which has been so handsomely received. "Boston, the Cradle of Liberty." What a ring of patriotism is there in those words! Boston has been truly called the Cradle of Liberty. She drove the British army from the soil in the early contest of the Revolution, and it never dared again to enter within its limits.

Sir, as to the other sentiment in the toast, "A pattern to her sisters," it does not belong to me to say whether that is so or not. It is you that have written the sentiment; it is you that have drunk the toast, and I must say nothing; still less must I say in regard to the perfect system of her government. I can report well of her system of government, but as I have some share in its administration, it does not become me to say anything about it. I have only come here to-night to express my obligations to the citizens of New York for the hospitalities and the kindness which the Boston delegation have received at their hands. We have had a very agreeable and a pleasant time. We have met not only gentlemen from New York, but from all parts of the country. And it seems to me there is a signification in this occasion, which cannot be overlooked. We have come together from all parts of the Union, not for the aggrandisement of our cities, not for any petty political triumph—who shall be President, who shall be Governor, or even who shall be Mayor; but we have come to do what we can

to promote the health, the cleanliness, and the happiness of our several localities. With again expressing to you, as Chief Magistrate of the city, my thanks in behalf of the Boston delegation, I will take my seat

EIGHTH REGULAR TOAST.—*Providence: Her success in preventing disease and preserving the health of her people, justifies the name she bears.*

Hon. W. M. RODMAN, Mayor of Providence, responded:

MR. MAYOR—In behalf of the city which I have the honor to represent, I most cordially and most heartily thank you. Compared with this vast metropolis, our little municipality is small, but in her kindly relationships and her protecting powers, she has made the effort to be as true to her inhabitants as the largest cities of the Union. She has been blessed in her efforts. We owe to Medical Science the protection which we have received, and through that scientific agency we acknowledge the power of that Divine Providence which has overshadowed us with its protecting wings. The goodly city which I represent, received its name in recognition of that holy power which guided the pilgrim in his exile to these shores; and when he found there his home, and that right which is so dear to every true freeman, the right to worship God free from every shackle, he bowed down upon our soil, and returned thanks to the Father of us all, and in recognition of that liberty named the place "Providence."

How many and varied are the associations that come thronging upon us, in the historical remembrance of the protecting power of God over this young Republic! Not only over Rhode Island, but over the old Thirteen, fell the blessing of God—that providential power that sheltered and protected her beneath its overshadowing wings; not only Providence in Rhode Island, but divine Providence over us all; over New

York in her majesty and vastness, over all the old Thirteen, enlarging and strengthening them in their efforts for independence. She was blessed then, but oh! how greatly has she been blessed in the prosperity of her children.

This morning we sat listening in admiration to the words of wisdom and counsel, as they fell from the lips of your venerable father in Medical Science (Dr. Francis). He spoke, gentlemen, of the early associations connected with our Revolutionary history, and may I obey the impulse of my heart for a moment, as I look around us here and see the flag of our nation, and hear our brethren from the several States—may I yield for a moment to the prompting, and speak of our relationships together, and of some of the associations that cluster around us? What did Dr. Francis say in connection with the history of Medical Science in this State? Incidentally he alluded to that which makes our hearts, as patriots, bleed, and that which makes us, as members of this confederacy, grateful to our Father and our God, that the memory of such men is left to us. He spoke of the Wallabout, of the Jersey Prison Ship, and the sufferings of the martyrs of liberty—those men who laid down their lives, that you and I might participate in the privileges which we are enjoying this night.

Let me, as a Rhode Island man, speak in the language of a Rhode Island man, fifty years ago, who, standing before his fellow-citizens in the year 1800, and rehearsing the story of the Revolution, alluded to those martyrs of liberty whose bones repose on yonder shore. He spoke of the old Jersey Prison Ship, and your hearts will indorse his sentiments I know, for I see the light of patriotism kindling in every eye at these allusions. Said Jonathan Russell:

“On board one only of these prison-ships, above eleven thousand of our brave countrymen are said to have perished. She was called the ‘Jersey.’ Her wreck still remains, and at low ebb presents to the world its accursed and blighted fragments. Twice

"in twenty-four hours the winds of heaven sigh through it and repeat the groans of our expiring countrymen; and twice the ocean hides within her bosom those deadly and polluted ruins which all her waters cannot purify. Every rain that descends, washes from the unconsecrated bank the bones of those intrepid sufferers. They ought to be collected in one vast ossuary, and on them, were it possible, there should be erected a colossal column, whose base sinking to hell, should let the murderers read their infamy inscribed on it; and whose capital of Corinthian laurel, ascending to heaven, should show the sainted patriots that they have triumphed."

But, gentlemen, I must not detain you, as the hour is growing late. Once the question was asked by a gentleman from New York on the floor of the House of Representatives of the United States, What is Rhode Island, who is she? The answer came, One of the old thirteen, and what the eye is to the elephant, Rhode Island is to the Union. She is small by the side of New York, but she is true to the Constitution, and so is New York, large as she is. Look at New York in all her length and breadth. The rainbows of Niagara encircle her brow; Erie, Ontario, and Horicon, like gems of beauty, glitter in the margin of her emerald vesture; meandering streams and circling rivers gird her round and round, while the broad Atlantic, freighted with the commerce of the world, pays willing tribute at her feet.

Gentlemen, permit me to offer the following sentiment:

THE CITY OF NEW YORK—*The commercial heart of the Union: may it ever pulsate healthily in all which honors dignity, virtue, truth.*

NINTH REGULAR TOAST.—*Norfolk: A Name which has become a proverb for the public spirit of her citizens, and the life-sacrificing devotion of the Medical Profession in the dark hours of disease and death.*

C. WHITTLE, Esq., was called upon to respond, and in doing so he said:

In the name of my colleagues, gentlemen, I thank you for the compliment you have paid to the city of Norfolk. As a non-professional delegate to the Convention, from that city, I echo from my heart the sentiment of approbation that you have expressed for the devotion of the medical men in the calamity which visited us. Almost half of the delegates to this Convention were among those that stood by her in the hour of her distress; they came from other cities, induced to do so by their regard for humanity and their devotion to medical science.

I regard, gentlemen, the acts of these medical men as being far more heroic than the acts of the soldier on the battle-field, in repelling an enemy; for under such circumstances animal excitement and the presence of a foe tend to make one courageous. But they were called upon to repel a secret foe. I turn from the contemplation of that topic to one more pleasing. The contemplation of an entire sympathizing community offering their wealth, their assistance, and their sympathy to their brothers in the hour of their distress, is well calculated to benefit the heart. Baltimore, New York, Boston, and almost every city throughout the Union, expressed their sympathy, and also opened their homes to the unfortunate sufferers. This is a pleasing fact, and proves moreover that we are, after all, but one people. Differ as we may upon sectional points and local questions, there is a feeling of brotherly kindness running through the whole, which every patriot should endeavor to cultivate, and is the best guarantee for continued prosperity.

TENTH REGULAR TOAST.—*The District of Columbia: A centre in our National Constellation; may the light of Sanitary Science radiate throughout the Union.*

Mr. J. F. CALLAN responded. He said:

Mr. President—I regret exceedingly that I am the only

representative present from the District of Columbia. I regret that my colleagues have not the opportunity to participate in the festivities so bountifully prepared for them by the city of New York to-night, because then you might have the opportunity of hearing an appropriate response to the sentiment which has just been given, and so handsomely received. I would fail in the attempt to express my own feelings upon this occasion, and I therefore content myself with returning, in the name of the District of Columbia, which I have had the honor of representing, in part, before the Convention, my sincere thanks for the compliment intended to be conferred upon it. The people of the District of Columbia feel a lively interest in all the subjects that have been discussed before the Convention for the last three days. And it will always be their pride that the great centre of the Federal Union shall be the centre from which the bright light of sanitary science shall emanate, as well as the light of every science intended to diffuse knowledge among men, and promote their social condition.

ELEVENTH REGULAR TOAST.—*Canada: our neighbor and competitor in the busy pursuits of commerce, yet always fraternizing with us in science and letters, and the arts of peace.*

Repeated calls were made for General F. E. MATHER, who finally yielded to the demands of the company, and spoke as follows:

MR. MAYOR—I appeal to you, as the head of this police, to protect me. Sir, I find I have fallen amongst the Philistines. I supposed that there was a degree of good-breeding and courtesy on the part of the medical profession, as well as upon the part of the corporate authorities of this city, by which an individual might be permitted to live under the peace of God and of his country. But, sir, it seems I am reduced here suddenly against my will into the position of

an outlaw. I am elevated, not by a gibbet, but by some other unknown and unanticipated force into my present conspicuous and most humiliating position. (The General stood upon a chair.) I would like to know why I am placed here? Is it to be made a laughing-stock for your merriment, Mr. Mayor? or is to please the boys on my left? Sir, am I one of the animals to be stirred up with the long pole? I had no idea that I entered a menagerie! But, sir, I am held out as President of the New York Sanitary Association. I believe there is such a thing in existence; and more, it is a novelty so far as this country is concerned; and if it is to speak on the subject of that Association I am put here, I am ready to talk to you. As I am on the floor, in regard to that Association I would say in all sober earnestness, I desire our friends from abroad to go home bearing in mind that we have all pledged ourselves, for once at least, to the great cause of sanitary reform.

We have done one good thing to-day in relation to the external sanitary police. The great principle to which I consider myself individually pledged at the present moment, is that of municipal and domiciliary police. In regard to that, gentlemen, I wish to say that it opens a field so vast, that it is almost beyond any estimate or computation. It embraces subjects which you all must admit are but little understood, and they are subjects which no living man has ever yet mastered. Why is this, when it is a matter that concerns us all at our homes and our firesides? It is a fact, that the subject of external sanitary police took its rise early in the history of the world, and in a state of society when the importance of sanitary regulations was not appreciated; but a change has come over the scene, and I think I behold the rising light which is to break forth in effulgence, and effect an entire revolution throughout this country, if not throughout the world. _ And we, in the city of New York, have taken the

initiative. We have started a Sanitary Association, and I ask our friends from all parts of the Union to take this matter into consideration, and where practicable, start kindred institutions. This subject is of such a nature, that you can approach every man with hopes of abundant success. If it be an appeal to Christian duty, or as a matter simply of morals, as a matter of preservation, of economy, or upon the great principle of political economy, you have every kind of material by which you can approach men, and the subject is of such a nature that you will be kindly received everywhere.

Dr. D. B. REID, of Edinburgh, was called for, who, in response to the invitation, said:

Mr. President and Gentlemen—In venturing to say a word or two in response to the call that has been made—without which I would not have occupied a moment of your time—I feel somewhat diffident: but having taken a part in the discussion of sanitary matters in England and other places, I feel it an honor to have been invited here on the present occasion. It has been my lot to have acted under four different governments in Europe, and to have visited this country under the direction of your President at Washington. I must say that nothing has been more interesting to me than the position of this city, and the interest it takes in respect to education; in respect to that great element of comfort in connection with the progress of man—the administration of water; and above all, in respect to the interest taken in sanitary improvement. I should wish you all, however, to visit the other side of the Atlantic. I am sure that there is no great question of liberty, or of science that has ever been mooted in this country, that has not had its advocates on the other side. I am not ashamed of the other side, for I think we have made some good points. I think you would find men in Scotland, England, and Ireland, who would be

glad to reciprocate with you in every thing connected with the progress of liberty, humanity, and the brotherhood of the human race.

Allow me to say a word in reference to sanitary improvement. I have invariably refrained from referring to points which I was only studying since my arrival in this country ; but I must say that I have been delighted with the progress made this day in respect to sanitary improvement at the Quarantine Convention. I think it will tell on both sides of the Atlantic, and above all, I think that that motion which endeavors to unite the governments of the world in a great combined movement, taking into consideration the ports of embarkation and the ports of arrival, at the same time the discipline of the sailor at sea, will tell throughout the commercial world, react upon the condition of the sailor at home, and promote every thing that is important to humanity and the general amelioration of the human race.

TWELFTH REGULAR TOAST.—*The Cities of Newark and Wilmington: Ardent anticipators in the great work of protecting and prolonging human life.*

Mr. PARKHURST, in responding to this sentiment, said :

Mr. President and Gentlemen—If any gentleman present could reasonably claim exemption from replying to a sentiment on this occasion, I think it is myself. I find to my astonishment, on perusing the programme of this evening's exercise, that for the first time in my life I have received the title of M.D. I have no claims to that honorable title—perhaps my title may be considered a great deal higher—that of an Alderman. Mr. President, there is one thing in reference to this matter of title, which I would like to have settled before consenting to accept the title of "M.D." It will be recollected by the gentlemen in attendance at the Convention this day, in the matter of taking a vote,

that it was proposed to divide the question—to call the names of the medical men first, and afterwards the names of the non-medical men. Some other gentlemen remarked that that would be getting at it in the right way; they would then have the sheep and the goats each by themselves. I simply want to know whether we are to go to the sheep or the goats. If that could be decided, I am ready to go either way.

The sentiment which has been offered, and so kindly received by the gentlemen of this meeting, refers to the cities of Newark and Wilmington, as being ardent participators in the great work of protecting and prolonging human life. Allow me to say in a few words, as far as Newark is concerned, our Board of Health is but a recent institution; yet we are making strenuous efforts to perfect it, so as to make it operative, and we are very desirous of obtaining all the information that would lead us in the right direction and give us success. With reference to the establishment of that Board of Health, until last evening I considered that it was founded upon right principles; although heretofore I have been always of the opinion that Boards of Health should be composed largely of medical men; yet the contrary has been the fact with us.

In our Board, which is composed of five members, we have but one medical man—our Health Commissioner. I say, up to last night I considered that very well, for I supposed the Health Commissioner would either rule the Board or the Board would rule him; but when I saw the unanimity among the physicians upon attendance at this Convention, I was entirely satisfied that my first formed opinion was correct, that local Boards of Health should be composed largely of physicians. Medical men, and they alone, understand the principles of medical science in every department. It only remains for me, in behalf of some of the most respectable gentlemen of the city of Newark, representing not only our Board

of Health, but our medical and other societies, to thank you sincerely for the sentiment which has been proposed and so well received.

Dr. WILSON, being called up, said :

I am under the necessity, sir, of pleading guilty to being a doctor. I cannot, like my friend, claim to be an Alderman ; I am not half large enough for an Alderman. I come from a very small State—the State of Delaware ; although, when I recollect that which Mayor Rodman represents (Rhode Island), I feel somewhat encouraged ; still, it is not my intention to inflict a speech upon you at this late hour. Almost every medical man has started this evening, by saying that he was no speaker. I can say so truly. As I have said, the State of Delaware is very small ; yet although it has a very limited extent of sea-coast, and not largely engaged in commercial pursuits, she is watching with very deep interest the doings of this Convention. She feels deeply interested in sanitary reform ; otherwise she would not have been represented at the first Convention in Philadelphia, or again at Baltimore, or here to-day. In conclusion I would say that you will ever find the city of Wilmington willing to second any proper effort for the protection and the prolongation of human life.

THIRTEENTH REGULAR TOAST.—*The Cities of Mobile and Memphis : Less favored by climate and attending circumstances than their more Northern sisters, their devotion to the cause of medical science is an earnest of their determination to conquer disease and preserve life*

Prof. WM. J. DARBY responded :

I do not feel authorized to reply to this sentiment, for I am not a citizen of Mobile ; but as a citizen of Alabama, I may return thanks to this Convention for the compliment that has been paid to the citizens of Mobile. If learning, if energy, if devotion to their profession, will accomplish the high objects indicated in this toast, you may be sure they will be ac-

complished. And may I be permitted to say that no class of physicians in any State or any city, have been more devoted in scenes of trial, than the physicians of Mobile. ? In their name I thank the gentlemen composing this Convention, and the Council of New York for their kindness in remembering them in this toast.

Dr. GUTHRIE spoke as follows :

Mr. President, and Gentlemen of this Convention : When I discovered my name on the programme, and was told by my friends that it was expected that I would make a speech, I sought out a friend and said to him, "I'll make a bargain with you. If you will go with me to the dinner, I will eat the dinner and you shall make the speech." I thought that that was a fair proposition—correct as a sanitary and hygienic regulation ; for, to ask a gentlemen to so bounteous a repast as this, and then require him to make a speech, is neither sanitary nor hygienic. But, said he, this is your misfortune ; they have quarantined you, and you will have to do both. Gentlemen, I never made a speech in my life. I am exactly in the position of a jolly friend of mine, who used to tell me that if he felt the day before as he always felt the day after he got "tight," he was sure he would never get "tight." If I had felt before eating the dinner as I feel afterward, I would have let the dinner alone, and should not have come here. But as I had an appetite for the dinner, as well as a desire to be present at the entertainment, I am caught in the trap, and you will be obliged to take my excuse for a speech. Accidentally placed here to represent the great Mississippi Valley—I believe the only representative from that section of the United States—I feel it incumbent upon me to say that the town of Memphis, on the banks of the Mississippi, feels as much anxiety in the success of sanitary measures as the city of New York. She stands not 1300 miles away

from you, but is only sixty short hours from you, and disease could pass from her borders to yours in that short space of time, passing through the metropolis of my friend from Virginia, up the river, and down the Louisiana and the Tennessee. We do not touch water from New York to Tennessee.

The great trade and commerce that is now carried on in the United States through these arteries of commerce, have made us one; they have united Memphis, Tennessee, and the whole Mississippi valley with the great metropolis of the Union. And, gentlemen, being thus united, being thus one in commerce, being thus one as a great people, where is the hand that shall not be palsied that shall lift it sacrilegiously to tear this Union asunder? Gentlemen, in the name of the South—though accidentally here to represent her—in the name of the South, so will it be understood. In the name of the great Mississippi valley, I thank this Convention for the stand they have taken in the cause of science this day. And if there were more of these Conventions, if the South and North came together and exchanged sentiments, heart to heart, hand to hand, intellect to intellect, there would be less of that cry of oppression in one section of the country over another. We should know each other better, we should feel each other's wrongs and each other's rights. We should appreciate the right, and we should stand as we stood in the days referred to so eloquently and so beautifully by the gentleman from Rhode Island; we should stand shoulder to shoulder, heart beating with heart, head working with head, and hands working with hands, until this nation should rise to be what it shall be, the greatest and most glorious nation over which the sun traverses. Gentlemen, I cannot make a speech, I merely wish to respond. (Voices: Go on! go on!) I merely rose to say to you as I feel authorized to do, knowing the feelings of the Mississippi valley, that while we send you our cotton and the products of our soil, and

receive in return the products of your looms, mills, and hands, there can be nothing but one feeling, and that is, love to the Union—the whole Union as it is. This day this Convention has made a mark, and that mark shall be a standing-point; it shall be a place where a nail is driven, as in a sure place, from which shall go forth correct opinions and correct knowledge, that shall tend to benefit the whole human family, and especially all the cities of this glorious confederacy.

Again, Mr. Mayor and Gentlemen of the Common Council of the city of New York, in the name of the Mississippi valley, I return you our thanks, begging that you will always remember, that what affects the prosperity of New York, affects the prosperity of all the cities and States of the Union; and my prayer to God is, that he will never permit that day to come when it will be otherwise than that the prosperity of one section of the Union shall be at all times conserved and protected by all the other sections of the United States.

FOURTEENTH REGULAR TOAST.—*Woman: That portion of the human family which most deserves and best appreciates the aid of Medical Science and the offices of kindness.*

Dr. SNOW, of Providence, responded as follows:

Mr. President—If there is a sentiment calculated to awaken every manly emotion of the soul, it is the one just proposed, and deeply do I feel my inability to respond to it in the manner that its importance deserves.

My inability arises not only from the fact that I am entirely unaccustomed to duties of this description, but also, with reference to this particular sentiment, from the fact that my appreciation of woman is so great, my heart is so full of the subject, that it is utterly impossible for me to find words to express my feelings.

Wherever we go we behold the power of woman's influence, we witness her disinterested heroism. In the chamber of sickness we see her kind offices when disease attacks the family circle; on the field of battle, we behold her like a ministering angel in the hospitals of the wounded and the dying; and when pestilence stalks abroad, we see woman, in her labors of love, exhibiting a bravery, a heroism more truly great, than the annals of war can produce.

So long as history shall record the terrors of the Crimea, and the greater terrors of the pestilence in Norfolk; so long as true valor is appreciated and woman is loved—*so long* will the names of FLORENCE NIGHTINGALE and ELIZABETH ANDREWS be held in grateful remembrance by a sympathizing world.

Permit me, gentlemen, in conclusion, to give you a sentiment in the words of another:

W O M A N:

"A seraph all holy, she gladdens our way,
And garlands December with roses of May;
And shines the heart's star, wherever we roam,
The beacon of love—the Angel of Home."

"THE GREAT WEST" was proposed, and Dr. BLAND was called upon to respond. He said he felt himself honored in being called upon to respond to that sentiment. He came from the Western State of Mississippi—from the city of ST. LOUIS. The great West was stretching from the western slopes of the Alleghanies towards the Pacific, and having thirty-five thousand miles of navigable waters, what a glorious future was before her!

Councilman LAMBIER proposed "the Press," and called upon Mr. WM. ANDERSON, of the *New York Herald*, to respond. In obeying the call, Mr. A. said it would ill become him to detain the company at that late hour by any extended

remarks. He would therefore simply content himself with thanking the delegates to the Convention and the members of the City Government for their forethought in remembering the Press. He assured them, that as the Metropolitan Press had heretofore advocated the cause of sanitary reform with its wonted zeal, it would continue to co-operate with the friends of a movement which deserved the hearty support of every philanthropist and lover of his race, until the great ends which the Convention sought to effect were accomplished, and the leading cities of our Union, and, indeed, throughout the world, were made as healthy as a strict code of sanitary regulations, effectively administered, could make them.

Other volunteer sentiments were proposed and heartily responded to, after which the delegates vacated the banquet hall, and soon after separated, highly pleased with the magnificent reception which was given them by the *New York Common Council*.

LIST OF DELEGATES REGISTERED.

NEW YORK.

New York Sanitary Association.

F. E. MATHER,	J. H. GRISCOM, M.D.
CHAS. H. HASWELL,	E. HARRIS, "
P. M. WETMORE,	STEPHEN SMITH, "
S. B. HALLIDAY,	D. B. REID, "
E. L. VIELE,	A. S. JONES, "
J. W. RITCH,	C. R. AGNEW, "
PETER COOPER,	JAS. S. COOPER, "
F. S. WINSTON,	WM. B. BIBBINS, "
N. CLEVELAND,	S. T. HUBBARD, "
CHAS. C. SAVAGE,	J.P. BATCHELDER, "
H. O'REILLY,	H. D. BULKLEY, "

H. GUEKNSEY, M.D.

Academy of Medicine.

J. W. FRANCIS, M.D.	A. H. STEVENS, M.D.
JOHN WATSON, "	JOS. M. SMITH, "
W. C. ANDERSON, "	S. S. PURPLE, "
J. McNULTY, "	T M. MARKOE, "
J. W. FREEMAN, "	ISAAC WOOD, "
J. W. STERLING, "	WM. ROCKWELL, "

By Invitation of the Convention.

JOSEPH BLUNT,	MORTIMER G. PORTER, M.D.
JOHN TRENOR, M.D.	GOUV'R M. SMITH, "
ALEX. HADDEN, "	

Commissioner of Health.

JED. MILLER, M.D.

Medical Association.

JOEL FOSTER, M.D.	A. UNDERHILL, M.D.
M. D. VAN PELT, "	JAS. O. POND, "

Governors of the Alms-house.

CHAS. BRUENINGHAUSEN, M.D.

Kappa Lambda Society of Hippocrates.

F. U. JOHNSTON, M.D.,	E. L. BEADLE, M.D.
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Commissioners of Emigration and State Emigrants' Hospital.

J. M. CARNOCHAN, M.D.,	HERMAN GULEKE, M.D.,
GEORGE FORD, M.D.	

Common Council.

THOMAS MCSPEDON, Alderman.	C. G. CORNELL, Councilman.
F. I. A. BOOLE, "	JOHN VAN TINE, "
THOMAS STEPHENS, "	F. J. OTTARSON, "
GEORGE STARR, "	B. T. RHODES, "
HENRY SMITH, "	WM. LAMBEER, JR., "
J. J. BRADLEY, Ald'n.	

New York Medical College.

E. H. DAVIS, M.D.

Pathological Society.

T. C. FINNELL, M.D.	WM. R. DONAGHE, M.D.
GEORGE WILKES, "	E. LEE JONES, "
G. T. THOMAS, M.D.	

Chamber of Commerce.

WILLIAM NELSON, FRAS. M. FRENCH,
DRAKE MILLS.

Bellevue Hospital.

JAS. R. WOOD, M.D. ISAAC E. TAYLOR, M.D.

Health Officer of Brooklyn.

SAMUEL BOYD, M.D.

Kings County Medical Society.

JAS. M. MINOR, M.D., A. N. BELL, M.D.,
W. H. WILLIAMS, M.D.

Brooklyn Medico-Chirurgical Society.

A. OTTERSON, M.D., E. N. CHAPMAN, M.D.

By invitation of Convention.

FRANK TUTHILL, M.D.

Staten Island.

J. H. JEROME, M.D., Physician of Marine Hospital.

Health Officer of Castleton, S. I.

E. C. MUNDY, M.D.

Richmond County Medical Society.

ISAAC C. LEA, M.D., T. C. MOFFATT, M.D.

Common Council of Troy.

ALFRED WOTKINS, M.D., T. C. BRINSMADE, M.D.
JAMES THORN, M.D.

By Invitation of the Convention.

WILLIAM COOPER, M.D.

Brooklyn City Hospital.

JOS. C. HUTCHINSON, M.D.

CANADA.

E. H. HODDEN, M.D.,

J. F. HASWELL, M.D.

MASSACHUSETTS.

BOSTON.

Board of Health.

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S. D. CRANE, Alderman.

EBEN'R ATKINS, Alderman.

GEO. A. CURTIS, "

CLEMENT WILLIS, "

JOS. T. BAILEY, "

WM. W. ALLEN, "

T. C. AMORY, "

CHAS. EMERSON, "

GEORGE DENNIE, "

JESSE HOLBROOK, "

SILAS PIERCE, Alderman.

H. G. CLARK, M.D., City Physician.

J. M. MORIARTY, M.D., Port Physician.

JACOB BIGELOW, M.D., Consulting Physician.

JOHN JEFFRIES, M.D., " "

D. H. STORER, " " "

JAMES AYER, " " "

HON. MOSES KIMBALL, President of the Board of Directors
of Public Institutions.

By Invitation of the Convention.

HON. A. H. PIERCE.

RHODE ISLAND.

PROVIDENCE.

Board of Health.

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HON. W. M. RODMAN, Mayor.

Medical Association.

F. H. PECKHAM, M.D.

By Invitation of the Convention.

JOS. MAURAN, M.D.

PENNSYLVANIA.

PHILADELPHIA.

Philadelphia County Medical Society.

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WM. MAYBERRY, "	J. H. SMALTZ, "
R. LA ROCHE, M.D.	

Board of Health.

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WM. TAYLOR,	WM. A. RUFFNER,
L. W. BUFFINGTON, M.D.,	W. L. BLADEN,
WM. A. PIPER, M.D.	

By Invitation of the Convention.

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T. HAMLIN WILCOX.

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WASHINGTON.

Board of Health.

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Newark Medical Association.

GABRIEL GRANT, M.D.,	EDWARD P. NICHOLS, M.D.,
M. BALDWIN, “	J. A. CROSS, “

Essex County Medical Society.

A. W. WOODHULL, M.D.,	S. H. SOUTHARD, M.D.,
W. PIERSON, M.D.,	E. T. WHITTINGHAM, M.D.

Hoboken.

HON. C. V. CLICKENER,	THOS. W. WHITLEY,
L. W. ELDER, M.D.	

Hudson Medical Society.

Dr. J. M. CORNELISON.

Corporation of Hudson.

M. ARMSTRONG.

Elizabeth City Council.

L. W. OAKLEY, M.D.

Hudson County.

H. D. HOLT, M.D.

Jersey City Corporation.

HON. D. S. GREGORY.

Board of Health—Jersey City.

THOS. R. VARICK.

By Invitation of the Convention.

I. P. TRIMBLE, M.D.
CHAS. F. LEHLBACK, M.D.

TENNESSEE.

MEMPHIS.

By Invitation of the Convention.

C. B. GUTHRIE, M.D.

DELAWARE.

Wilmington Medical Association.

JAS. F. WILSON, M.D.

VIRGINIA.

Norfolk Board of Health.

WM. M. WILSON, M.D. (Health Officer.)

City of Norfolk.

GEO. W. COWDERY, M.D.

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CONWAY WHITTLE.

Board of Trade.

W. H. LOVETT.

ALABAMA.

Auburn Council.

JOHN DARBY, M.D.

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